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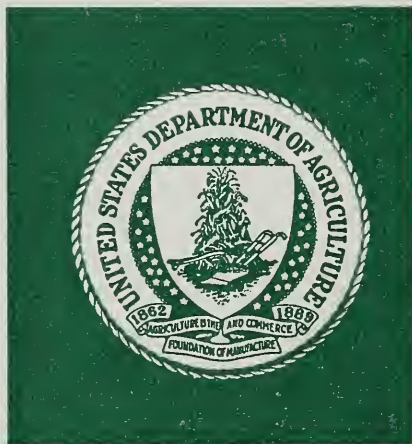
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POTT-SEM-TURKEY WATERSHED  
Seminole and Pottawatomie Counties, Oklahoma

FINAL ENVIRONMENTAL IMPACT STATEMENT

Hampton Burns  
State Conservationist  
Soil Conservation Service

Sponsoring Local Organizations

Seminole County Conservation District  
316 South Wewoka, Wewoka, Oklahoma 74884

Shawnee Conservation District  
P.O. Box 1924, Shawnee, Oklahoma 74801

Pott-Sem-Turkey Watershed Conservancy District  
316 South Wewoka, Wewoka, Oklahoma 74884

Prepared June 1975

PREPARED BY

UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
Stillwater, Oklahoma 74074



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USDA ENVIRONMENTAL IMPACT STATEMENT

POTT-SEM-TURKEY WATERSHED PROJECT  
Pottawatomie and Seminole Counties, Oklahoma

Prepared in Accordance with  
Sec. 102(2)(C) of P.L. 91-190

Summary Sheet

- I. Final
- II. Soil Conservation Service
- III. Administrative
- IV. Description of Proposed Project Action

A project is proposed for watershed protection and flood prevention under the authority of the Watershed Protection and Flood Prevention Act (PL-566, 83rd Congress, 68 Stat. 666), as amended. The project measures include accelerated application of land treatment measures for the protection of 22,247 acres of agricultural land and the installation of 11 floodwater retarding structures for the reduction of floodwater, sediment, and erosion damages on 2,564 acres of flood plain land in Pottawatomie and Seminole Counties, Oklahoma.

- V. Summary of Environmental Impact

Average annual flooding and related damages within the watershed will be reduced by 80 percent, encouraging farm operators to restore flood plain lands to former productive levels.

The project installation will provide opportunities for employment of local labor presently unemployed or underemployed as well as increase business activity and improve economic conditions in the region and State as a whole.

Upland erosion will be reduced by 20 percent as will sediment delivered to the mouth of Turkey Creek and to Eufaula Reservoir.

Lives will be protected through the elimination of flash floods below the floodwater retarding structures and through better control of mosquitoes and other disease vector insects.

The sediment pools will provide resting places for migratory waterfowl and create habitat which will benefit all water-oriented wildlife.

## SUMMARY SHEET

A total of 1,290 acres will be involved in floodwater retarding structure sites. Of this area, 297 acres will become water surface, 883 acres will be subject to intermittent inundation in flood pools, and 110 acres will incur changed use in the dam and spillway areas.

Protection from flooding may cause conversion of some small areas of flood plain from timber to cropland.

A total of 18 identified archeological sites will be disturbed or destroyed by installation of structural measures and the construction activities will also result in some temporary erosion, sedimentation, noise, and air pollution.

VI. Alternatives considered included land treatment only, land treatment with channel enlargement, land treatment with flood proofing of fixed flood plain improvements and acquisition of high risk flood plain areas, land treatment combined with a floodway, and no project action.

VII. Agencies from which written comments have been received include:

- Department of the Army
- Department of the Interior
- Environmental Protection Agency
- Oklahoma Historic Preservation Officer
- Governor of Oklahoma
- State Clearinghouse
- Regional Clearinghouse
- National Audubon Society

VIII. Draft statement received by CEQ on November 19, 1974.

USDA SOIL CONSERVATION SERVICE  
FINAL ENVIRONMENTAL IMPACT STATEMENT 1/  
for  
The Pott-Sem-Turkey Watershed, Oklahoma

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of Public Law 83-566, 83rd Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Seminole County Conservation District  
Shawnee Conservation District  
Pott-Sem-Turkey Watershed Conservancy District

PROJECT PURPOSES

Project sponsors plan to achieve, through the establishment of this project, with the assistance of the public and the Soil Conservation Service, the following basic goals:

1. Quality in the natural resource base for sustained use.
2. Quality in the environment to provide attractive, convenient, and satisfying places to live, work, and play.
3. Quality in family standards of living based on community improvement, economic opportunity, wholesome leisure, and cultural and educational opportunities.

The guiding purpose is to help meet man's requirements for goods and services while the natural environment is maintained in a quality condition.

Watershed Protection

Project goals for watershed protection through conservation land treatment were set as a result of an in-depth study of the current program and its rate of application. Current erosion rates on cropland, pastureland, and forest land were compared to establish allowable soil losses and formed a prime consideration in setting these goals. Other considerations included trends in farm management, ownership, and management and use of the ecosystems and their plant and animal communities.

At the time of planning about 80 percent of the total watershed area was covered by 205 conservation plans prepared through cooperative

1/ All information and data, except as otherwise noted were collected during watershed investigation by the SCS and Forest Service, USDA.



## PLANNED PROJECT

agreement with the Soil Conservation Service and the Department of Interior, Bureau of Indian Affairs. On these areas about 60 percent of the planned practices have been applied. A primary goal is to accelerate the application of conservation measures and to prepare about 20 additional conservation plans. At least 90 percent of the farm units in the watershed should be covered by such plans at the end of the 5-year installation period.

### Flood Prevention

A primary purpose of this project is the reduction of floodwater and associated damages to the maximum extent possible, consistent with the wishes of the local people, the economic feasibility of available alternatives, and the preservation of environmental integrity. The levels of protection proposed for the project include the reduction of average annual flooding from about 2,250 acres to about 800 acres, with an accompanying reduction in floodwater damages of about 80 percent, thereby, directly benefiting about 50 owners and operators of flood plain lands.

## PLANNED PROJECT

### Land Treatment Measures

Conservation land treatment measures will be installed on 2,380 acres of cropland, 14,106 acres of pastureland, and 5,761 acres of rangeland. Land treatment measures to be installed on cropland will be a combination of conservation cropping systems, contour farming and crop residue management. Crop residue management will be an essential measure to be applied.

Land treatment measures to be installed on pastureland will be a combination of pasture and hay management, pasture and hay planting, ponds, and critical area planting. For rangeland, the measures to be installed will be deferred grazing, proper grazing use, brush control, and ponds.

The construction of forty farm ponds, with 301 ponds already in use in the watershed, will provide watering places for livestock and wildlife.

A concerted effort will be made to interest district cooperators in fishpond management and fishpond stocking through the cooperation of the U. S. Fish and Wildlife Service and the Oklahoma Department of Wildlife Conservation.

The Soil Conservation Service and the Bureau of Indian Affairs will, as needed, assign additional technicians and aids to assist landowners and operators cooperating with the soil conservation districts.

Technical assistance in the land treatment program will consist of soil surveys, resource inventories, development of conservation plans on individual farms, consultative assistance and technical services in the installation of land treatment measures.

## PLANNED PROJECT

The Oklahoma Forestry Division will provide the technical assistance necessary to help the landowners develop a detailed forest management plan for his woodlands. Such a plan will direct the optimum development of all the potential resource values of the owner's woodlands. The Forestry Division, under the going Cooperative Forest Management programs, is already offering such forestry management assistance, making tree planting stock available and providing extensive forest fire protection to private landowners within the watershed.

### Structural Measures

A system of eleven single purpose floodwater retarding structures will be installed to protect flood plain land that cannot be adequately protected by land treatment measures alone (see Appendix D). Floodwater retarding structure earth dams will vary in height from 20 to 27 feet. Surface areas of sediment pools cover from 13 acres to 54 acres. Detention pool sizes vary from 54 acres to 225 acres. Approximately 237 acres of bottomland and 60 acres of upland will be in the sediment pool areas. An additional 177 acres of bottomland and 706 acres of upland will be inundated temporarily during periods of excess rainfall runoff. Another 110 acres will be occupied by dams and spillways, making a total area of 1,290 acres directly involved in the floodwater retarding structures. The combined drainage areas of these proposed structures comprise 49 percent of the watershed. The structures will have a total floodwater detention capacity of 6,095 acre feet and will detain temporarily an average of 4.35 inches of runoff from the watershed area controlled. Floodwater retarding structures numbers 1 through 9 and 11 are planned to detain temporarily the direct runoff from a 25-year frequency, 10-day storm period. Structure number 10 will temporarily store runoff from a 50-year frequency storm of the same duration. Detailed structural data is provided in Appendix E.

Principal spillway conduits are to be reinforced concrete pipe with a minimum diameter of 18 inches. There is sufficient capacity in all structures to permit the use of vegetated emergency spillways.

All structures will involve the use of earthfill embankments. Preliminary geologic investigations made on all proposed sites indicate that sufficient borrow material is available in the sediment pool areas. No additional land rights will be needed as a source for borrow material.

One hundred and eight acres of forested area will have to be cleared within the 297 acres surface area of the sediment pools.

Sites located in the Konawa Formation are not expected to have rock in the emergency spillways. Sites 8, 9, and 10, located in the Vanoss and Ada Formations, are expected to have 30 to 60 percent rock excavation in the emergency spillways. Total rock excavation in these three sites is estimated to be 300 cubic yards.



## PLANNED PROJECT

Contractors installing the structural measures will be required to adhere to strict guidelines for minimizing soil erosion, water and air pollution during construction. Such practices as the use of hay and other type mulches and/or temporary vegetation to minimize wind and water erosion, and controlled burning to comply with state standards will be included in the construction contract. Plans for stabilization measures such as sodding or other treatment during or immediately following construction will also be a part of the construction contract.

As a result of a field survey, a professional archeologist has recommended that archeological resources at structures sites 4 and 7 be further investigated prior to disturbance by construction activities. The total cost of this work is estimated to be approximately \$1,600. The National Park Service has been designated as the responsible agency for the salvage or preservation of archeological materials by Public Law 86-523. The Soil Conservation Service will provide information showing the site locations, approximate areas to be flooded, approximate areas to be disturbed, approximate schedules of construction and other pertinent data to the Secretary of Interior for use in determining the course of action to be pursued.

All collection and salvage of data and materials will be performed as expeditiously as possible with a minimum of disruption and delay to the functions of the Soil Conservation Service in its administration of Public Law 83-566.

Where possible, construction completion will coincide with a favorable season for establishment of vegetation.

Provision is made at all sites for 100-year sediment storage. The crest of the principal spillways will be set at the 50-year sediment storage elevation. Storage of water to the 100-year sediment storage elevation may be allowed where water rights are obtained to add the second 50-year sediment storage. Storage of water to the 100-year sediment storage elevation will be handled on a site-by-site basis when land rights are obtained.

The habitat destroyed by structural measures is principally grassland with some areas of bottom land hardwoods bordering the stream channels. These areas provide food and cover to such species as rabbit, squirrel, quail, songbirds, and an occasional deer.

Wildlife plantings and measures to mitigate damages to habitat caused by the installation of structural measures will be made as follows:

1. Selected plantings of legumes, shrubs, and trees will be made at floodwater retarding structure sites 1, 3, 4, and 8 to provide food and cover habitat for wildlife. Plantings will be made on areas of from one-half to three acres and will be fenced to prevent grazing or trampling by livestock.

## PLANNED PROJECT

2. Wildlife habitat plantings will be established along fence rows in odd areas, corners, gullies, ditches, and eroded areas.
3. Brush shelters to improve cottontail habitat will be constructed at each site with brush and timber obtained as a result of the clearing operations.

The total estimated cost of establishing the structural works of improvement is \$1,097,423. The total estimated cost of land treatment measures to be installed during the installation period is \$214,833.

### Operation and Maintenance

The land treatment measures on privately owned lands will be operated and maintained by the landowners or operators of the farms and ranches on which the measures are installed under agreements with the Seminole County, and Shawnee Conservation Districts and the Bureau of Indian Affairs. Representatives of the districts and the Bureau of Indian Affairs will make periodic inspections of the land treatment measures to determine maintenance needs and will encourage landowners and operators to perform needed maintenance. District-owned equipment will be made available for this purpose.

The Seminole County Conservation District and the Pott-Sem-Turkey Watershed Conservancy District will operate and maintain the eleven floodwater retarding structures and the wildlife mitigating measures associated with Sites 1, 3, 4, and 8.

The estimated average annual value of operation and maintenance is \$3,300, based on adjusted normalized prices and maintenance needs on similar watersheds. Necessary maintenance will be accomplished through the use of contributed labor and equipment, by contract, or by a combination of these methods.

Landowners will be encouraged and may agree to maintain the structures located on their lands. A maintenance fund will be established prior to awarding contracts for construction.

Prior to Federal funds being made available for construction through a project agreement, the local sponsoring organizations will prepare and execute an agreement satisfactory to the State Conservationist for operation and maintenance for structural measures to be installed. The maintenance agreement will declare the amount of funds on hand for maintenance purposes, also methods of replacing the funds as portions are used.

Provisions will be made for free access of District, State and Federal representatives to inspect all structural measures and their appurtenances at any time.



## PLANNED PROJECT

Operation and maintenance inspections for all floodwater retarding structures will be made on the following basis:

1. The Service employee responsible for operation and maintenance inspections and follow-up and the sponsors will make a joint inspection annually, after unusually severe floods, and after the occurrence of any other unusual conditions that might adversely affect the structural measures. These inspections will continue for three years following installation of each structure. Inspections after the third year will be made annually by the sponsors. They will prepare a report and send a copy to the Service employee responsible for the operation and maintenance inspections and follow-up.
2. The Service employee responsible for operation and maintenance inspections and follow-up will thoroughly review the sponsors' reports of inspections and maintenance. Evidence that inspections or needed maintenance are not being performed properly and promptly will be reported immediately to the State Conservationist, who must then take appropriate action on the reported deficiencies.

An "establishment period" of three years after the acceptance of a structural work of improvement is hereby prescribed. During this period, the Service may bear such part of the cost of any needed repairs as is proportionate to the original cost borne by the Service in the construction of the works of improvement. Specifically excluded from this policy are:

1. Routine upkeep including replacement of minor or short-lived parts of structures, equipment, or facilities.
2. Repairs determined by the Service to have been caused by improper operation or routine upkeep or both.
3. Repairs for any purpose for which construction costs are not authorized to be paid for in whole or in part with funds appropriated to the Service.

With respect to any needed repairs during the "establishment period", no action should be taken by the Service or the local organization which would lessen or adversely affect any legal liability of the contractor or his surety for payment of the cost of repairs.

The sponsors understand and recognize their responsibilities in the operation and maintenance of the project measures.



## PLANNED PROJECT

They understand that the functions of operation and maintenance includes the items discussed in the following paragraphs and in addition any other unforeseen maintenance needs.

Operations -- Action taken by the sponsors to make the structure function as designed. Operation includes the operation of gates and other features to regulate the retention or release of water for flood control or other use in accordance with a predetermined plan. Operation must comply with state or local laws as they apply to the use and control of water.

Maintenance -- Work done by the sponsors to keep the structure in good operating condition during its useful life.

The maintenance of an adequate vegetative cover of desirable species requires the repairing and reseeding of eroded areas, control of undesirable vegetation, fertilization and proper grazing.

Earth dam maintenance should include replacement of soil removed by rodents, clean out or replacement of relief wells and drains, repair of damaged rip-rap, stabilization of slide areas, maintain dikes at proper elevation and replacement of eroded material, immediately revegetate any eroded areas that develop in the emergency spillway, and fence repairs.

### Project Costs

#### Estimated Costs (dollars)

	P. L. 566 Funds	Other Funds	Total
Land treatment	17,850	196,983	214,833
Construction	635,645	-	635,645
Engineering services, project administration & other costs	245,629	216,149	461,778
Total Project	899,124	413,132	1,312,256

## ENVIRONMENTAL SETTING

### Physical Resources

The Pott-Sem-Turkey Watershed is located in central Oklahoma about thirty-five miles east of Oklahoma City. Turkey Creek heads about two miles north of Earlsboro and flows in a northeasterly direction for approximately 14 miles to its confluence with the North Canadian River.

The watershed has a drainage area of 34,560 acres (54.0 square miles) and is located in the Arkansas-White-Red water resource region and the North Canadian River sub-region. About 31,040 acres of the drainage area are in Seminole County and 3,520 acres are in Pottawatomie County.

The watershed is in the Central Rolling Red Prairies and Cross Timbers Land Resource Areas. Most of the upland soils are deep to moderately deep, medium textured, slowly permeable to permeable, and moderately productive. There are a few areas of deep medium textured to clayey, permeable to slowly permeable soils. Bottom land soils are deep, medium textured, permeable and highly productive.

Erosion on cultivated upland soils and flooding on bottom land soils have been serious problems in past years. An effective program of land treatment has greatly alleviated the upland erosion problem but flooding on bottom land soils remains a serious threat to agricultural enterprises.

The capability classification is an interpretive grouping of standard soil survey information made primarily for agricultural purposes. The classification was developed by the Soil Conservation Service to assist farmers and ranchers in developing plans for proper use of their land. Classes I, II, and III include the land suitable for regular cultivation with the application of appropriate conservation measures. Class IV land is best suited for use as pastureland or hayland, but may be cultivated occasionally with proper safeguards. Classes V, VI, and VII are not suited for cultivation but may be used for grazing, or for forestry if soil and climate permit. Class VIII land is unsuited to agricultural uses but may be adapted to recreation, wildlife or other uses.

The approximate percentage of soil capabilities within the watershed are as follows:

<u>Capability Class</u>	<u>% of Watershed</u>
II	12
III	6
IV	8
V	4
VI	68
VII	2
	<hr/> 100

## ENVIRONMENTAL SETTING

The land use of the watershed is:

<u>LAND USE</u>	<u>ACRES</u>	<u>PERCENT</u>
Cropland	6,200	18.0
Rangeland	7,260	21.0
Pasture	14,000	41.0
Forest Land	6,000	17.0
Miscellaneous	<u>1,100</u>	<u>3.0</u>
TOTAL	34,560	100.0

The watershed is on the western edge of the Prairie Plains Homocline Tectonic Province. The exposed rocks are westward dipping shales and sandstones of lower Permian and Upper Pennsylvanian age. There are a few areas of high-lying alluvium which are Pleistocene in age.

Topography in the watershed is gently rolling to hilly with mean sea level elevations ranging from about 870 feet to about 970 feet. The stream channel gradient averages about 7.0 feet per mile.

Water for livestock and rural domestic use is supplied from farm ponds, wells, and from stream flow. Well water is obtained from sandstone at depths of 50 to 100 feet on upland areas. Water is obtained from wells in the alluvium at depths of 20 to 50 feet.

The flood plain varies in width from 2,500 feet in the lower reaches to 900 feet or less in the upper reaches. The total flood plain of Turkey Creek and its tributaries, excluding the stream channels, is 2,564 acres.

The population of the watershed is rural in nature though many residents commute daily to jobs in Shawnee and Oklahoma City.

Oil and gas are the only minerals of commercial significance in the watershed. Petroleum production began about 1925 and for the period from 1925 through 1948 oil production for Seminole County averaged almost 43 million barrels per year. By 1952 production had declined to about 9 million barrels.

Groundwater from sandstone and conglomerate members of the Vamoosa and Vanoss formations is of generally good quality and is available in adequate quantity for local domestic uses. Some water is also obtained from alluvium in the flood plain area.

Woody cover occurs mostly in narrow bands along the creeks and drainageways, varying from sparse to dense and consisting mainly of elm, cottonwood, ash, pecan, post oak, blackjack oak, hackberry, sumac, and gray stem dogwood.



## ENVIRONMENTAL SETTING

The channels of Turkey Creek and its tributaries are unmodified, well defined, natural channels with generally continuous flow except during the summer months. They are classified as "NI" channels in accordance with the USDA Watershed Protection Handbook. There are no wetland acres in the watershed.

The watershed lies in the sub-humid climatic zone. The average frost-free period of 218 days extends from March 28 to November 4. The mean temperatures range from 81.0 degrees Fahrenheit in summer to 40.0 degrees in winter. The extreme recorded temperatures were 12 degrees below zero and 118 degrees above zero.

The average annual rainfall recorded at the Shawnee gage, about six miles west of the watershed, is 37.22 inches. The minimum of 18.63 inches fell in 1936 and the maximum of 59.71 inches was recorded in 1957.

Forty percent of the rainfall occurs during the months of April, May, and June. The remaining 60 percent is distributed rather uniformly throughout the other nine months. Flood producing storms may occur in any month of the year but they are most frequent during the spring months.

### Present and Projected Populations

It is estimated that the population of the Pott-Sem-Turkey Watershed in 1973 was 2,200. The watershed is in a BEA economic area that has a projected growth rate of 1.5 percent per year to the year of 2020. Based on this population growth projection, the watershed will have a population of 3,540 by the year of 2020.

### Economic Resources

The major agricultural industry is beef cattle production. The primary use of the flood plain lands is the production of crops in support of this industry. The general flood plain land use is: alfalfa, 18 percent; small grain, 22 percent; grain sorghum, 5 percent; pasture, 50 percent; and miscellaneous, 5 percent. The respective yields are 4 tons, 48 bushels, 60 bushels, and 160 pounds of beef.

There are about 140 farms or ranches in the watershed. These range in size from approximately 40 acres to 640 acres.

Recent land sales in the watershed have indicated a flood plain land market value of \$400 per acre and an upland land value of \$150 per acre. These values are higher than the Seminole County average land value principally due to the watersheds relatively short distance from Oklahoma City and Shawnee.

## ENVIRONMENTAL SETTING

The accessibility of farms and ranches to roads and markets is good. There are about 20 miles of hard surfaced Federal, State, and County highways. There is also a network of county roads, many of which have been graveled. Interstate Highway 40 crosses the northern portion of the watershed giving easy access to Oklahoma City where an important stocker cattle market is located. State Highways 3, 99, and 99A also cross the watershed at various places.

In 1969, Seminole County, in which a major portion of the watershed is located, had a total civilian labor force of 8,850. Of this total, 14 percent had agricultural employment. It is estimated that 75 percent of the farm operators in the watershed have some off farm employment. Most of the farm operators with off farm employment commute to Seminole, Shawnee, Midwest City, and Oklahoma City.

Other census data for Seminole County that would be descriptive of the watershed are as follows:

Item	1964	1969
Average size of all farms (acres)	238	295
Value of land and buildings per farm	\$18,832	\$37,615
Value of land and buildings per acre	82	128
Proportion of tenancy (percent)	13	9
Average age of farm operators	52	53

### Fish and Wildlife Resources

Under present watershed conditions, there is practically no fishing in the upper reaches of Turkey Creek due to the intermittent nature of the stream. In a pool at the lower end of the creek near its confluence with the North Canadian River, there is a moderate amount of fishing by local fishermen. The quality or amount of stream fishing is not expected to change significantly in the future without or with the project.

Wildlife includes white-tailed deer, wild turkeys, bobwhites, fox squirrels, mourning doves, waterfowl, raccoons, skunks, opossums, bobcats, foxes, mink, and coyotes.

The white-tailed deer and wild turkey populations are small but increasing and should provide more hunting in the future.

Due to the interspersed cover and cultivated fields, the watershed provides very good habitat for bobwhites. Moderate numbers of fox squirrels are found along the wooded streamcourses. Habitat for cottontails is moderate and for mourning doves is good.

Waterfowl use of the watershed is restricted to resting and some feeding on farm ponds during periods of migration.

## ENVIRONMENTAL SETTING

There is a limited amount of sport hunting for raccoons and coyotes. Trapping for fur animals is limited and fur pelts are marketed from the local area.

### Recreational Resources

There are no public recreation areas within the watershed. Shawnee Reservoir provides the nearest waterbased public recreation area.

There are several floodwater retarding structures about ten miles east of the watershed that are open to the public at no charge. These sites, in addition to 50 or 60 others within a 90 minute drive of Oklahoma City, are publicized by the Oklahoma State Conservation Commission in a brochure available to the public.

Water stored in the sediment pools of these floodwater retarding structures in the area have water of good quality and have proven very popular for fishing. Sanitary facilities at these structure sites are limited to essential needs.

### Archeological, Historical, and Unique Scenic Resources

Apparently the watershed area was considered a marginal resource area by prehistoric populations. No large campgrounds or areas suggesting lengthy occupations have been encountered. Extant archeological sites indicate only limited excursions into the area.

The campground locations were probably occupied only as long as a readily available food supply existed. When these resources were exhausted the group moved to another location. Workshop sites of a similar nature were used during brief excursions into the area to obtain needed lithic materials.

A total of 25 archeological sites have been identified in proximity to the floodwater retarding structures proposed in this project. Eleven of these locations are workshop sites of undetermined age or occupational period. Seven campground sites and one workshop site are assigned to the Southern Plains Archaic occupational period. Of the six remaining sites, two are Late Prehistoric image and four are Late Historic homestead or cemetery sites.

A check of the National Register of Historic Places and the latest edition of the Oklahoma Historical Society's "Annual Preservation Program" revealed no historic sites in the watershed. No historic areas were identified during planning. The Service will, during the installation phases, comply with Public Laws 89-665, 93-291, and Executive Order 11593.

### Soil, Water, and Plant Management Status

The land use trend in the watershed has been from row crops to tame pasture and hayland. As the trend toward improved pastures continues, the past practice of indiscriminately using the woodlands for grazing is decreasing.



## ENVIRONMENTAL SETTING

The watershed area is served by the Soil Conservation Service Field Offices located at Wewoka and Shawnee, Oklahoma. These field offices provide technical assistance to the Seminole County and Shawnee Conservation Districts. The field offices have assisted the farmers and ranchers in preparing 205 basic soil and water conservation plans on 26,982 acres. About 60 percent of the planned practices have been applied. Forestry assistance is available from the Oklahoma Department of Agriculture, Division of Forestry.

The Land Operations Work Unit Offices of the Bureau of Indian Affairs located at Wewoka and Shawnee, Oklahoma, furnish technical assistance to farmers operating Indian allotments. This assistance is given through conservation plans and lease stipulations. Of the 1,240 acres of restricted land, 720 acres are under conservation plan with 48 percent of the planned treatment applied.

### Projects of Other Agencies

Eufaula Reservoir was constructed under the supervision of the Corps of Engineers, U. S. Army, Tulsa, District. The dam site is located on the Canadian River approximately twelve miles east of Eufaula, Oklahoma. The upper limit of the flood pool is about 70 miles downstream from the mouth of Turkey Creek. The project is for flood control, hydro-electrical power, navigation, recreation, and fish and wildlife purposes. The effects of measures included in the Pott-Sem-Turkey Watershed work plan, though minor, will be integrated into the overall plan for the basin.

## WATER AND RELATED LAND RESOURCE PROBLEMS

### Land and Water Management

Installation of adequate land treatment on individual farms and ranches in the watershed has been a difficult achievement. Much of the upland, though not suited to intensive cultivation, was planted to row crops in the early years of statehood. By the time the Soil Conservation movement gained momentum in the 1930's and 40's, severe damage had already been done to most of the shallow soils. The land was retired from cultivation only when there was no longer enough soil on the underlying rock to support cultivated crops. Plow grooves are still visible on sandstone outcrops in many abandoned fields.

Natural re-establishment of grass cover on eroded areas was slow and scrub trees and brush invaded many old fields. By the 1960's conservation practices were present in quantities sufficient to stem the ruinous erosion on much of the watershed although the job is yet far from complete.

### Floodwater Damage

Under present land use conditions, a 24-hour, 100-year frequency storm would yield 6.13 inches of surface runoff. This runoff would inundate 2,564 acres. The total area flooded annually by all floods is estimated to average 2,252 acres.

## WATER AND RELATED LAND RESOURCE PROBLEMS

The flood plain ranges in width from 2,500 feet in the lower reaches to 900 feet or less in the upper reaches. The general flood plain land use is: alfalfa, 18 percent; small grain, 22 percent; grain sorghums, 5 percent; pasture, 50 percent; and miscellaneous, 5 percent. The respective yields are 4 tons, 48 bushels, 60 bushels, and 160 pounds of beef per acre.

Flood plain landowners report that storms of major proportions, those flooding more than 50 percent of the flood plain, occur once each year, on an average. In 1947 eight floods occurred. Road and bridge damages were severe in 1957. Two damaging floods occurred in 1969. The frequency of flooding has had a significant influence in limiting the flood plain soils to production below their capabilities. This has a noticeable effect on the area economy.

Turkey Creek has flooded State Highway 99 to a depth of 3-feet, two times in the last 24 years. Cars have been washed from roads during these occurrences creating a hazard to life.

The two-year frequency storm of 24-hour duration will flood 1,707 acres. It is estimated that as a result of this flooding crop and pasture, other agricultural and non-agricultural damages will amount to \$20,700, under without project land use conditions.

The average annual gross value of crop and pasture production per acre (current normalized prices, 10/15/73) for the floodplain is about \$93.

Based upon without project land use conditions, it is estimated that the monetary average annual direct and indirect damages, as a result of flooding, based upon a 100-year evaluation period, will amount to \$112,000 (current normalized prices, 10/15/73). These damages are itemized as follows:

<u>ITEM</u>	<u>DAMAGES</u>
Crop and Pasture	\$ 57,760
Other Agricultural (fences, debris, etc.)	10,240
Non-agricultural (roads, bridges, etc.)	22,440
Sediment	7,300
Erosion	1,180
Indirect	<u>13,080</u>
TOTAL	\$112,000

Some species of wildlife suffer from floodwaters. These include ground nesting birds, burrowing animals, and rabbits.



## WATER AND RELATED LAND RESOURCE PROBLEMS

### Erosion Damage

Sheet erosion on formerly cultivated and cultivated land in the upland portion of the watershed is the major source of sediment. Gully and roadside erosion considering the whole watershed are moderate. Gullies in formerly cultivated upland fields are mostly v-shaped and are relatively shallow, generally ranging from two to six feet in depth. There are few active overfalls and establishment of vegetation on gully slopes, though sparse, has greatly reduced the rates of lateral expansion in the last 20 years. Roadside gullies along the steeper segments of county roads have in most cases, ceased to deepen because of the relatively shallow depth to rock. However, the sides of these gullies remain denuded of any vegetation as a result of periodic grading that constitutes the maintenance program for these roads. Though these gullies represent a visual blight on the aesthetic aspects of the watershed, they do not compose a significant source of sediment.

In past years, erosion from oil-waste areas produced a large portion of the sediment but has presently diminished greatly with the decrease in drilling activities and the stabilization of the old eroded areas on rock or heavy clay subsoils. Erosion on these areas has affected about 475 acres in the watershed, on which from 6 to 24 inches of soil has been removed. These areas, like the roadside gullies, are eyesores on the appearance of the landscape, but are no longer critical sediment sources. Annual gross erosion from all sources is approximately 1.32 acre-feet per square mile.

Flooding has caused sheet and gully scour damage on 54 acres of the floodplain. The sheet scour has removed from 4 to 12 inches of topsoil from some areas in bottom land fields while gully scour has cut channels from 12 to 24 inches deep, 10 to 20 feet wide, and up to 200 feet in length of the floodplain. In addition to the loss of soil fertility caused by this scour, these areas also suffer decreased productivity from the impairment of surface water drainage from these areas. Measured by reduced productivity, damage ranges from 20 to 30 percent. During the past few years, flood plain scouring has decreased. This decrease has resulted from changes in land use, the adoption of conservation practices, and the establishment of vegetative cover on land placed in the Conservation Reserve. Erosion damage amounts to an annual monetary damage of \$1,180.

### Sediment Damage

Sediment produced by accelerated erosion has been deposited on the flood plain by floodwater since the first field was broken to cultivation in Territorial days, probably around 1890. In early years, when the sediment resulted from the erosion of topsoil, the deposition was not damaging and may have even been beneficial. In later years,

## WATER AND RELATED LAND RESOURCE PROBLEMS

when the topsoil was gone and the infertile subsoil and parent material had become exposed on upland areas, the sediment deposited on the flood plain began to result in damage in the form of reduced productivity. Eventually the sediment damage, in conjunction with floodwater damage, caused a change in use of much of the flood plain from cultivated crops to pasture.

Damage to sediment deposition on the flood plain of Turkey Creek ranges from slight to moderate. A total of 302 acres, about 13 percent of the total flood plain, has been damaged by deposits of silty sand ranging in depth from 6 inches to two feet. Damages are estimated to be from 20 to 30 percent in terms of reduced productivity.

Sediment yield at the mouth of the watershed is presently about 20 acre-feet per year. About 12 acre-feet of this total are estimated to be delivered eventually to the Eufaula Reservoir. This represents an annual monetary damage of \$570.

A study of suspended sediment at the mouth of the watershed showed an average annual concentration of 1,265 mg/l under present conditions.

Burning of trees and grass cover has not been a major problem. Educational programs showing the detrimental effects of burning have been effective in preventing fires. These programs have been supported by the schools, towns, extension service, and Conservation Districts.

### Drainage Problems

Drainage is not a problem since there is no inherently wet land in the watershed. Farm drainage and some land leveling may be needed on areas where surface drainage is inadequate.

### Irrigation Problems

There is a need for supplemental irrigation during drouth periods. Sediment pools will provide limited supplemental supply for irrigation; however, because the quantity is not dependable, and future quality is questionable, most landowners will not make the necessary expenditure to develop a system. No interest was shown during planning to add additional storage for irrigation.

### Municipal and Industrial Water Problems

At present there is not a demand for municipal or industrial water. During the early stages of planning, some interest was shown in developing municipal and industrial water in site 5 by the small town of Earlsboro located two and one-half miles to the southwest. Investigations showed water quality in the area to be highly questionable for municipal uses. Earlsboro sought and obtained a suitable supply elsewhere thus eliminating the only expressed interest in additional water supply.

Topography limitations and the small drainage areas above structures limit the potential for surface water development.



## WATER AND RELATED LAND RESOURCE PROBLEMS

Good potential exists for development of ground water. Sandstones and conglomerates of the Vamoosa and Vanoss formations produce water of generally good quality. The municipal supply for the City of Seminole is presently supplied from this ground water reservoir.

### Recreation Problems

Recreation needs in the watershed are not significant in view of the relatively sparse rural population and the existence of other water based recreation facilities within a fifty mile radius of the watershed, including Shawnee Lake, Lake Thunderbird, Lake Stanley Draper, Lake Eufaula, and numerous flood prevention structures.

### Fish and Wildlife Problems

Wildlife habitat in the watershed has improved steadily with the retirement of land from cultivation and the improvement of cover conditions through the application of conservation practices, but is still seriously deficient.

There is practically no fishing in the upper reaches of Turkey Creek due to the intermittent nature of the stream. A pool at the lower end of Turkey Creek provides moderate amounts of fishing to local residents.

Additional fish and wildlife habitat is needed. There are no endangered species in the watershed.

### Water Quality Problems

No published sources of water quality data are available for the Pott-Sem-Turkey Watershed. Water quality in the upper reaches of the stream system has been impaired by activities related to oil production. Water quality data on other streams in the area, such as Wewoka Creek, show high mineral content and dissolved solids. The mineral content is due primarily to salt (sodium chloride), much of which comes from oil-field brines. High-flow or storm-flow water generally contains small amounts of dissolved minerals and is of a good quality.

When the planned project has been completed, quality of water below the structures will be improved by a reduction of solids present in the streamflows. This reduction will result from proper land treatment and the trapping of sediment of structures. Quality of water impounded in structures will vary from site to site. Water in the sediment pool of Site 5 is expected to be of poor quality. Oil production above the site has produced salted-out areas. Several old oil wells are still in production and one new well is being drilled.

Oil production in other areas of the watershed is limited and should have little effect on stored water. However, it is expected that water quality will gradually deteriorate in all structures over the years as water is replaced by trapped sediment.

## WATER AND RELATED LAND RESOURCE PROBLEMS

### Economic and Social

The 1969 Census of Agriculture for Oklahoma reports that 42 percent of the 944 farms in Seminole County had farm sales of less than \$2,500 in 1969. The proportion of low income farm units in the watershed would be comparable to this percent for Seminole County.

The counties in which the watershed is located are not eligible for assistance at this time under Title IV of the Public Works and Economic Development Act. However, in 1972 the counties were listed by the Manpower Administration of the U. S. Department of Labor as counties having substantial unemployment equal to 6 percent or more of the work force. The Seminole County unemployment rate in 1969 was 4.3 percent.

Employment opportunities fluctuate with the overall economic conditions within the State and nation. The opportunities for off-farm employment of people desiring this type of employment appear to be adequate. In addition to the operator, farms require only seasonal employment.

It is estimated that no more than 5 percent of the farms or ranches in the watershed require 1.5 man-years or more of hired labor.

People within the watershed respond well to meetings that are to the interest of the community. There is no established community center; however, there is one school and one church that provide a place for community activities.

### RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

This proposed project does not conflict with the objectives and specific terms of any Federal, State, and local land use plans, policies, or controls, including those developed in response to the Clean Air Act or the Federal Water Pollution Control Act Amendments of 1972.

### ENVIRONMENTAL IMPACT

#### Conservation Land Treatment

Land treatment will have a significant effect in reducing floodwater and sediment damages on flood plain lands. The application of a conservation and land treatment program will increase farm income and result in a better standard of living for farm families.

An accelerated land treatment program will reduce present condition runoff of the 100-year frequency storm from 6.13 inches to 5.82 inches, causing a reduction in flooding from 2,564 acres to 2,436 acres. After installation of the total project, the area inundated will be further reduced to 1,981 acres. Average annual flooding with the project installed will be reduced from 2,252 acres to 813 acres.

The reduction in flooded acres will reduce the average annual direct and indirect floodwater damages 78 percent.



## ENVIRONMENTAL IMPACT

The major crops being grown on the flood plain, under present watershed conditions, are alfalfa, small grains, and grain sorghums. About 50 percent of the flood plain is in pasture use. It is estimated that with the project installed, pasture use of the flood plain will be reduced to 25 percent, and alfalfa, grain sorghums, and small grains increased.

### Structural Measures

Approximately 50 owners and operators of flood plain lands will be directly affected by reduced flood damage as a result of the structural measures. The reduced flooding will give farm operators the incentive to restore the flood plain land to crops capable of providing higher net returns. It is estimated that alfalfa hay and improved pastures will be the primary sources of enhanced profits following project installation. Processors of agricultural products and businesses selling supplies to those engaged in agricultural production will be indirectly affected by the project. Average annual damages to the road and bridge systems within the watershed will be reduced from \$22,440 to \$5,740.

The total area subject to permanent or intermittent inundation by floodwater retarding structures is about 1,180 acres. Of this total, 466 acres are reserved for sediment storage over the project evaluation period. These sediment reserve areas are expected to fill with water and provide a variety of uses until sediment accumulation gradually reduces the reserved storage. Dams and spillways will occupy an additional 110 acres, making a total of 1,290 acres directly affected by structural measures.

The sediment pools will have numerous uses for wildlife, agricultural and non-agricultural water management, pollution abatement, and environmental betterment. The intermittently inundated areas above the structures, reserved for floodwater storage to be released at an established rate, can be developed and used for pasture.

Due to the type of geologic formations in the site vicinities there may be some groundwater recharge in the immediate site areas. However, due to the lenticular nature of the interbedded sandstones and low permeability of intervening shales, lateral water movement will be restricted to local areas. Consequently, completion of the planned project will have little affect on the water table of the watershed as a whole.

The 50-year sediment pools for the proposed structures in the Pott-Sem-Turkey Watershed work plan have a combined initial surface area of 297 acres. Plate 2 in the U. S. Department of Commerce Weather Bureau Technical Paper Number 37 indicates a mean annual lake evaporation of approximately 59 inches for the Pott-Sem-Turkey Watershed while the nearest U. S. Weather Bureau precipitation station at Shawnee has a long term average annual rainfall of 37.22 inches. This results in a net annual evaporation loss of 21.78 inches (59.00 minus 37.22 inches) from the surface of the lakes. Assuming that the lake pools were always full, a net evaporation loss of 21.78 inches on 297 surface acres would result in an average annual evaporation loss of 539 acre feet. Average

## ENVIRONMENTAL IMPACT

annual runoff maps for the 1931-1960 period developed by the U. S. Geological Survey and published by the Oklahoma Water Resources Board indicates that the average annual runoff would be about 5.5 inches or 15,840 acre-feet from the 54.0 square miles of drainage area in the Pott-Sem-Turkey Watershed. The 539 acre-feet of lake surface evaporation loss annually would represent a 3.4 reduction in water yield from the project area. With the exception of those isolated reservoirs where water rights are obtained to store water up to the 100-year elevation, the reduction in yield will decrease from 3.4 percent immediately after construction to zero at the end of 50 years as the sediment pools are filled with sediment.

The flood protection provided by the proposed project may bring about more intensive use of the cropland and pastureland in the flood plain. One facet of this land use may be increased application of fertilizers and pesticides. Application rates will be influenced more by future economic conditions than by the fact that flooding will be reduced.

Present scientific know-how does not permit exact quantification of water quality changes caused by the use of agricultural chemicals; however, some of the facts relevant to this question are listed below:

1. There is evidence that sediments play a major role in transporting some agricultural chemicals.<sup>1/</sup> Soil losses in the upland areas in the watershed will be reduced from 72 acre-feet to 66 acre-feet annually by land treatment measures. Sediment yield at the mouth of the watershed will be reduced from 20 acre-feet to 9 acre-feet per year by the proposed project.
2. Some nutrients are transported in solution by overbank flows. This project will considerably reduce the number and severity of overbank flows. The average annual acreage of flood plain inundated will be reduced from 2,252 acres to 813 acres.
3. Legal restraints on the use of long life pesticides will continue to bear upon the use of undesirable chemicals in the watershed.

The possibility of eutrophication of the stream system resulting from potential enrichment by nitrogen and phosphorus fertilizers has been considered. Published reports on the subject point out that "Enormous growth of plants in streams and lakes does not occur if the nitrate as "N" is kept below 0.3 mg/l and the total nitrogen as "N" is below 0.6 mg/l.<sup>2/</sup> The range of nitrate concentrations at the nearby Hog Creek water quality station was from 0.0 to 7.1 mg/l; while the weighted concentration was well above 0.6 mg/l. Data on phosphate concentrations was not available. Not only must nitrogen and phosphorus be present in sufficient quantities and in the proper chemical forms, they must also

<sup>1/</sup> Agricultural Research Service report at the joint SCS-ARS Southern Regional Workshop, Chickasha, Oklahoma, Jan. 31-Feb. 1, 1974.

<sup>2/</sup> Muller, W., "Nitrogen Control and Pollution of Streams", Water Pollution Abstracts No. 29,454(1955).



## ENVIRONMENTAL IMPACT

be present in the proper proportion. A common nitrogen to phosphorus ratio of approximately 30:1 is required to promote an algal bloom while the ratio for specific algal forms may vary from 15:1 up to 50:1. In addition to the nitrogen to phosphorus ratio, algae growth is also controlled by trace mineral requirements, water turbidity, temperature, etc. Plankton growth was reported to be thirteen times more abundant in clear, and 1.5 times more abundant in moderately turbid waters than in muddy Oklahoma ponds. 3/

Algal growth at present is not an apparent problem in the Pott-Sem-Turkey Creek Watershed. A very limited amount of research data is available on the effects of increased fertilizer usage. The following data collected by the Agricultural Research Service from July 1972 through June 1973 was extracted from a paper presented at the American Society of Agronomy meeting in Las Vegas, Nevada, in 1973:

<u>Water-*</u> <u>shed</u>	<u>Area</u> <u>Ac.</u>	<u>Land</u> <u>Use</u>	<u>Ferti-</u> <u>lizer</u>	<u>Total</u> <u>Surface</u> <u>Runoff</u> <u>(Inches)</u>	<u>Weighted Mean Concentrations</u>		
					<u>Nitrogen</u> <u>TKN</u>	<u>Phosphate</u> <u>Soluble</u>	
						<u>Total</u>	<u>Ortho</u>
C-1	17.8	dryland cotton	Never**	7.4	3.29	0.54	0.49
C-2	44.3	irrigated cotton	Yes	9.4	3.44	0.90	0.81
C-3	29.9	irrigated cotton	Yes	9.8	3.96	0.68	0.61

\*All plots are located on similar flood plain soils which are primarily McLain Silt Loam or Reinach Silt Loam.

\*\*Plot C-1 has no history of fertilizer application.

From this analysis it may be concluded that the natural fertility of these plots is relatively high. Although not apparently significant, some increases in nutrient levels do occur in runoff from the irrigated, fertilized plots. It is not known how much of the increases are caused by fertilizer additions. It is apparent that the runoff is increased by irrigation on fields C-2 and C-3.

Based on known data, it is not expected that the proposed project will have significant adverse effects on downstream water quality.

The project will facilitate the control of mosquitoes and other disease vector insects.

### Economic and Social

Due to project installation, the monetary output of the agricultural sectors will be increased by about \$37,000 annually. Personal incomes will be increased by an estimated \$15,000 annually. An analysis of project effects indicate that agricultural employment on a long-term basis will be increased by two people, and total employment by four people.

3/ Fichter, G. S., "Clear Waters-Good Fishing", Oklahoma Game and Fish News, 11:5, 3(1955).

## ENVIRONMENTAL IMPACT

The project will create additional employment opportunities. It is estimated that 14 man-years of semi-skilled jobs will be created during the project construction period, with 3.2 man-years of jobs continuing through the life of the project. The firms contracting for installation of floodwater retarding structures will hire skilled and unskilled labor from the immediate locality. The operation and maintenance of the project measures over the life of the project also will provide employment opportunities for local residents.

Secondary effects, including increased business activity and improved economic conditions in the surrounding communities, will result from project installation.

Soil loss from upland in the watershed will be reduced by land treatment measures from 72 acre-feet to 66 acre-feet annually, a decrease of 20 percent. Sediment yield at the mouth of the watershed from all sources will be reduced from the present rate of 20 acre-feet to 9 acre-feet annually by the complete project. Floodplain erosion presently accounts for approximately 4 percent of the annual gross erosion in the watershed and about 5 percent of the total sediment yield at the mouth of the watershed. Sediment yield to Eufaula Reservoir with the project will be reduced approximately 6 acre-feet annually. With the project, the concentrations of suspended sediment at the mouth of the watershed would be reduced by approximately 48 percent.

With the project, an area of 297 acres of moderate to good habitat for wildlife will be inundated as a result of areas reserved for sediment storage in floodwater retarding structures. An additional 883 acres will be subject to temporary inundation during periods of excessive runoff. Another 110 acres will be occupied by dams and spillways. The 407 acres affected by the structures and the sediment pools will result in a loss of wildlife habitat. Such species as rabbit, quail, squirrel, deer, turkey, opossum, skunk, and associated predators and song birds will be displaced. Animals living in these areas will probably migrate into adjacent areas and their numbers might be slightly reduced, particularly the deer and turkey. It is anticipated that the primary land use of the areas immediately below the structures will not change significantly.

The presence of 297 surface acres of water scattered throughout the watershed will provide new resting and feeding areas for migratory waterfowl. The lakes will also provide food and habitat for such water oriented species as beaver, mink, raccoon, and muskrat. The number of these species are expected to increase in the site areas.

The sediment pool of Site 5 may have some pollution as a result of runoff from salted-out areas around oil wells that will reduce optimum fish production. However, the pools of the remaining sites will contain good quality water and provide potential for development of fishery resources.



## ENVIRONMENTAL IMPACT

Due to the small areas affected by the sites, petroleum exploration and production activities will be essentially unaffected in the site areas. However, these activities which occur below the sites will be benefited due to reduced flooding. The reduction in flooding will also reduce the amount of pollution by oil and brine which has occurred in the past when these facilities have been flooded.

Of the 25 archeological sites identified in the vicinity of floodwater retarding structures, only two will be inundated in sediment pool areas. An additional nine sites will be inundated periodically in the flood pool areas and subjected to occasional wave action. Seven of the sites lie above water storage elevation but will be disturbed or destroyed by construction activities. The remaining seven identified sites, while located near floodwater retarding structures, are not expected to be disturbed as a result of project actions.

The population of the watershed is rural. The structures will provide protection to flood plain lands for a more stable crop production. The potential adverse affects of the project on local communities which would be due to secondary growth would be negligible. The improved tax base in the communities will provide funds which could be used for better pollution control facilities for such things as sewage plants, and solid waste disposal. This entire area is essentially rural. Any secondary growth will result in such minor changes in esthetics, air, and noise pollution that this section of the environment will remain essentially unaffected.

The relocation of any person or farm operation is not expected to result from the installation of project measures.

The increased production from flood plain lands, as a result of the project, will put new demands upon transportation, processing, and marketing industries. To meet these new demands, employment will be encouraged.

Farm operators, in order to make the most profitable use of the protected flood plain lands, will increase their purchase of fertilizer, seeds, and other supplies necessary for efficient production.

The project will eliminate flash floods below structures that result in rapid inundation of roads and highways, endangering the lives of travelers. The elimination of these floods also relieve landowners from much tension and worry.

### Favorable Environmental Impacts

1. Average annual flooding and related damages within the watershed will be reduced, encouraging farm operators to restore flood plain lands to former productive levels.
2. Project installation will provide opportunities for employment of

## ENVIRONMENTAL IMPACT

local labor presently unemployed or underemployed as well as increase business activity and improve economic conditions in the region and State as a whole.

3. The project will facilitate control of mosquitoes and other disease vector insects by reducing the number of stagnant pools which remain following flooding.
4. Soil loss by upland erosion will be reduced approximately 20 percent.
5. Sediment delivered to the mouth of Turkey Creek will be reduced approximately 55 percent.
6. Sediment yield to Eufaula Reservoir from the watershed will be reduced by six acre-feet annually.
7. The project structures will control flash floods that otherwise would result in rapid inundation of roads and highways, endangering the lives of travelers.
8. The sediment pools will provide resting places for migratory waterfowl and create habitat which will benefit all water-oriented wildlife.

### Adverse Environmental Effects

1. About 110 acres of land now used principally for agricultural purposes will be changed to dams and spillways with limited agricultural and wildlife use.
2. An area of 297 acres will be inundated by water for about 50 years when all of the water will be replaced by sediment.
3. An area of 883 acres will be subject to intermittent inundation in the flood pool areas of the structures.
4. Protection from flooding may cause conversion of small areas of flood plain immediately below structures from timber to cropland.
5. Of 25 archeological sites located in or near floodwater retarding structures, 18 will be disturbed or destroyed.
6. Temporary disturbance of environment by construction activities will result in some erosion, sedimentation, noise, and air pollution.

## ALTERNATIVES

The first alternative considered was a program of land treatment measures alone. This program would be effective in reducing upland erosion but would result in only minor reductions in floodwater damages. Land owners and operators in the flood plain would be forced to maintain the land use in pasture as a result of continuing flood risks. The estimated cost of land treatment alone is about \$214,800. This amount will be less than would be required if the program were extended over a 10 to 15 year period. The amount of land treatment on a watershed will be the same if it is completed in 1 year or 15 years. The reduced cost of the accelerated land treatment will be due to inflation raising the cost of application if the measures are installed over an extended period of time.

The second alternative considered was that of land treatment and channel enlargement. A channel with sufficient capacity to provide approximately the same level of protection as the selected project would cost about \$1,225,000, as compared with the selected project cost of \$897,450. The annual cost would be increased about 36 percent while the average annual benefits would be decreased by about 3 percent. Construction of the waterflow channel with its attendant spoil banks would result in the loss of 55 acres of potentially productive agricultural flood plain land and about 10 acres of wildlife habitat immediately adjacent to the present channel.

The third alternative considered was that of land treatment combined with flood-proofing of fixed flood plain improvements and acquisition of flood plain areas for public uses. The land treatment program would be identical to that in the selected plan in both effect and cost.

The flood proofing feature of this alternative would involve about four miles of roads and about fifteen bridges in the watershed which are subject to flood damages. The estimated costs of raising the affected roads and bridges above flood levels would total about \$250,000.

Other improvements which incur damage are fences and farm buildings. Conventional multiple-strand barbed wire or woven wire fences could be replaced by single strand electrified fences with electrical sources located above flood levels. These single-strand fences would be less susceptible to damage as well as easier and more economical to repair. The cost of replacing about 55,000 feet of existing fences in the flood plain area with single-strand electrified fence is about \$12,500.

Buildings located in the flood plain are mostly pole-frame shelters for farm implements, livestock, or hay. These buildings have dirt floors with roofs and walls of corrugated metal. Since the principal cause of damage to these buildings is the force of floodwater against



## ALTERNATIVES

the walls, and since their principal function is for overhead protection from the weather, the buildings could be open on the sides perpendicular to the direction of floodwater current. However, the contents of the buildings could be protected only by raising the floors above flood levels. The use of earth fills within concrete retaining walls, with ramps to permit access of machinery or livestock, would provide protection to both the building and its contents. The estimated cost of modifying twelve such structures is \$30,000.

The acquisition of about 1,700 acres of flood plain land within the area flooded by a two-year frequency storm was considered to be a necessary part of this alternative. This area would be fenced to exclude livestock. The estimated cost of acquiring the land and fencing it is \$850,000.

The total estimated cost of the combined features of this alternative is \$1,356,500. The average annual reduction in damages realized from installation of implementation of this alternative would include about \$14,000 from crop and pasture, \$6,000 from other agricultural, and \$20,000 from roads and bridges. Sediment and erosion damages would be reduced by about \$1,200 annually. Total damage reduction benefits accruing to this alternative would be an estimated \$41,200 annually.

In comparison with the selected project the costs are increased by 20 percent while benefits are decreased by 30 percent.

The fourth alternative considered was that of land treatment combined with a floodway. The land treatment program would be identical to that in the selected alternative in both effect and cost. The floodway would require the commitment of about 250 acres of agricultural land and about 75 acres of bottom land hardwood areas along the present stream channel. The costs of land acquisition and construction for this alternative are estimated to be about \$950,000. Total cost including land treatment would be about \$1,164,000.

This alternative would provide little protection to roads and bridges and a lesser level of protection to the agricultural flood plain than the selected alternative plan, and at a slightly greater cost. In addition, although the commitment of land in the floodway would involve about the same total acres of land as that in dams, spillways and sediment pools of floodwater retarding structures of the selected alternative, the potential productive value of the land that would be involved in the floodway is about double that of the land that will be involved in floodwater retarding structures.

The fifth alternative considered was that of no project action. With no action, floodwater damage would continue to accrue. The going land treatment program would accomplish the objectives of the planned 5-year accelerated land treatment program in about 10 to 15 years. Land use in the flood plain would remain in low value pasture. Average annual net benefits of \$32,467 would be foregone by this alternative.

Alternatives	: Total		:After Completion :		Acres Needed
	: Installation:	Cost	Annual : Annual	: Benefit :	
Accelerated Land Treatment (installed in 5-years)	214,800	10,742	-32,467		
Land Treat. & Chan. Enlgmt.	1,225,000	78,950	<u>1/</u> 89,350		65 <u>3/</u>
Land Treat. & Floodproofing	1,356,000	84,103	<u>1/</u> 72,800		1,700 <u>4/</u>
Land Treat. & Floodway	1,164,000	83,808	<u>1/</u> 67,200		325 <u>5/</u>
No Action (Land Treatment installed over 10-15 years)	337,236	<u>2/</u> 16,862	-32,467		
Land Treatment & 11 Flood- water retarding structures	1,312,256	67,993	100,460		407 <u>6/</u>

- 1/ The annual cost of monitoring this alternative was estimated using the same percent of the installation cost as was used for the selected alternative (6.2 percent).
- 2/ Based on inflation increasing at the same rate as occurred between 1965-1975 (157 percent in 10 years).
- 3/ 55 acres cropland and 10 acres wildlife habitat.
- 4/ Cropland and wildlife habitat along stream channel.
- 5/ Cropland and wildlife habitat along stream channel.
- 6/ Structure and sediment pool areas.

#### SHORT-TERM VS. LONG-TERM USE OF RESOURCES

A coordinated plan identified as the Central Oklahoma Project has been investigated by the Corps of Engineers. This study covered extending navigation from the Arkansas River to the vicinity of Oklahoma City. The North Canadian River Basin tributaries in general are not adapted to P. L. 566 projects and the few that are suitable will not exert any appreciable cumulative effect upon the main stem of the river.

The measures included in the Pott-Sem-Turkey Watershed work plan will be integrated into the overall plan for the basin, but will exert little effect upon the North Canadian River with the exception of the minute reduction in sediment contributed to Eufaula Reservoir.

The productivity of the agricultural land in the watershed decreased gradually from 1900 through World War II. Overgrazing, uncontrolled burning, cultivation of marginal soils, and other improvident agricultural practices caused depletion of fertility, accelerated erosion, increased flooding, and general diminution of agricultural productivity.

A gradual adoption of conservation farming practices, along with the development of adequate supplies of chemical fertilizers following World War II, allowed farmers to regain a measure of the lost productivity. However, the best and most fertile land remained subject to serious flooding.

The watershed plan proposes a level of protection consistent with long-term agricultural uses of the flood plain lands. However, the planned conservation treatment and use of the land in accord with its capabilities or limitations, in combination with the flood protection provided by the structural measures will not only greatly prolong the life of these land and water resources but will insure increased latitude of options for their long-term use and permit continued use to serve the present generation while preserving it for future generations. After the designed project life of 100 years, the project will still be effective in conserving the land and water resources of the watershed.

#### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Agricultural and terricolous wildlife uses will be eliminated for 297 acres to be inundated by the sediment pools. Flooding of 883 acres of grassland in the flood detention pools will periodically interrupt wildlife and agricultural uses of these areas for limited periods. An area of 110 acres will be committed from agricultural use to dams and spillways.

All energy and material involved in construction will be irreversibly committed resources.

The commitment of watershed areas to the various uses necessary for project installation will not be altered in the near future.

#### CONSULTATION AND REVIEW WITH APPROPRIATE AGENCIES AND OTHERS

When planning activities were authorized, the Soil Conservation Service mailed an announcement to all concerned Federal and State Agencies that a Watershed Work Plan was to be developed for the Pott-Sem-Turkey Watershed. This announcement invited each agency to participate and make contributions to the plan.

A biological reconnaissance of the watershed was made by personnel from the Oklahoma Department of Wildlife Conservation, U. S. Fish and Wildlife Service, and the Soil Conservation Service. Wildlife habitat considerations and mitigation measures discussed in the biological reconnaissance report were included in work plan development.



The state historic preservation officer was consulted with respect to historical and archeological resources that might be eligible for nomination to the National Register of Historic Places.

An assessment of the archeological resources of the watershed was conducted by a consulting archeologist with the Oklahoma Archeological Survey.

When the proposed plan for structural measures was completed, a meeting with a sites approval committee to represent the sponsors and the Watershed Planning Staff was scheduled. Site Committee approval for each of the eleven individual sites was given. The Sites Committee then passed a resolution that the eleven sites proposed and evaluated by the Watershed Planning Staff be included in the work plan.

A public hearing was scheduled to present the proposed plan, answer questions and inform the public that all suggestions and comments should be submitted in writing to the local sponsoring organization.

Invitations to attend the public hearing were mailed directly to two County, eleven State and nine Federal Agencies, two other organizations, and fifty landowners and farm operators.

A notice of the meeting also appeared in the Wewoka, Oklahoma, Daily Times newspaper on Tuesday, January 11, 1972.

Representatives from two county, one state, and three federal agencies and 13 landowners were present at the public hearing on January 18, 1972.

Only one letter of protest concerning the location of one floodwater retarding structure was received.

Agencies, conservation groups, and organizations requested to review and comment on the draft environmental impact statement include the following: 1/

- Department of the Army (R)
- Department of Commerce (NR)
- Department of Health, Education and Welfare (NR)
- Department of the Interior (R)
- Department of Transportation (NR)
- Environmental Protection Agency (R)
- Advisory Council on Historic Preservation (NR)
- Federal Power Commission (NR)
- Oklahoma Historic Preservation Officer (R)

Office of Equal Opportunity, USDA (NR)  
Governor of Oklahoma (R)  
State Clearinghouse (R)  
Regional Clearinghouse (NR)  
Natural Resource Defense Council (NR)  
Friends of the Earth (NR)  
Environmental Defense Fund (NR)  
National Wildlife Federation (NR)  
National Audubon Society (R)  
Environmental Impact Assessment Project (NR)  
Isaac Walton League, Oklahoma Chapter (NR)  
Sierra Club, Oklahoma Chapter (NR)  
Oklahoma Wildlife Federation (NR)  
Tulsa Audubon Society (NR)

1/ (R) = Response; (NR) = No response



## COMMENTS AND RESPONSES

Comments received from the preceding listing are summarized in this section and copies of their original letters are in Appendix B.

### United States Department of Interior - Work Plan

Comment 1: General comment on format and a suggestion to make section headings consistent in the work plan and environmental impact statement.

Response: The documents were revised to use the same headings where appropriate.

Comment 2: Clarification is needed of the section "Effects of Improvement - Fish and Wildlife".

Response: This section has been expanded in the final plan to clarify its meaning.

Comment 3: The report does not explain the effect of structural measures on water quality.

Response: This section has been expanded in the final plan.

Comment 4: Effect of reservoirs on groundwater is not explained.

Response: This section has also been expanded in the final plan.

Comment 5: If funds from the National Park Service for archeological salvage are not available, the SCS will be responsible for implementing mitigation measures.

Response: Noted. The Office of Management and Budget has not made a final decision on this statement. At this date, OMB has advised the SCS that they are not authorized to expend funds for archeological salvage.

Comment 6: Values of mineral deposits in the project area were furnished for 1972.

Response: Noted.

Comment 7: The Bureau of Sport Fisheries and Wildlife should be changed to the U. S. Fish and Wildlife Service.

Response: Correction made.

U. S. Department of Interior - Environmental Impact Statement

Comment 1: Petroleum exploration and development activities should be described.

Response: Due to the small areas affected by the sites, petroleum exploration and production activities will be essentially unaffected. The final EIS has been changed to reflect this information.

Comment 2: The report does not indicate how road, bridge, and other utility modifications are handled, including conflicts between the petroleum industry such as the pipeline in Site 2.

Response: Pipelines, powerlines, etc., are either moved or inundated based on private agreements between the affected companies and the local sponsoring agencies. The pipeline mentioned in Structure 2 will not need to be moved or modified. An easement allowing temporary inundation is all that is required. All conflicts of this type are resolved by the sponsors before construction is scheduled.

Comment 3: Responsibility for implementing the measures proposed to mitigate impacts to cultural resources is the responsibility of the SCS.

Response: Noted. The Office of Management and Budget has not made a final decision on who can expend funds for this type of mitigation. At this date, the SCS has been advised by OMB that the Service is not authorized to expend funds for recovery or salvage of archeological resources.

Comment 4: Compliance with Historic Preservation Act which requires coordination with the State Historic Preservation Officer is not shown.

Response: The final EIS has been changed to reflect the needed coordination.

Comment 5: Clarification of storm frequencies and flooded acres as shown on page 13, is needed.

Response: The confusing portion of this comment has been clarified in the final EIS.

Comment 6: Control of mosquitoes and other disease vectors is doubted since there are no wetlands in the watershed.

Response: Although there are no wetlands as classified in USDI Circular 39 in the watershed, following a flood there are numerous low lying areas where water is temporarily detained. These small pools often last long enough for a hatch of mosquitoes to occur. With

flooding controlled, these pools are eliminated. In addition, many of the mosquito larve are normally consumed by small fish in the detention reservoirs. This point has been clarified in the final EIS.

Comment 7: Clarification of wording concerning flash flooding on page 23 is needed.

Response: The wording has been changed to clarify the meaning.

Comment 8: Is the cost of accelerated land treatment measures shown in the work plan the same as, more than, or less than, the amount that would be spent over the 10-15 year period of a normal land treatment plan?

Response: The explanation for land treatment costs has been expanded in the final EIS.

Comment 9: A tabular summary in the alternative section of the Environmental Impact Statement would be helpful.

Response: This information is summarized in the final statement.

#### General Comments

Comment 1: A description of the planned project, site locations, and structural data are very general. More detailed information is needed.

Response: Additional data has been provided in Appendices D and E of the final EIS.

Comment 2: Environmental Setting Plant and Animal Resources heading does not agree with the text or the heading in the work plan.

Response: The title of this section has been changed to agree with the work plan and the discussion now agrees with the title.

Comment 3: Recreational Resources discussion is limited to Public Recreation areas which are non-existent and ignores recreational resources.

Response: The discussion under Recreational Resources discusses the only existing recreational facilities in the watershed. There are numerous farm ponds suitable for fishing, and wooded areas which would be suitable for hunting, in the area. However, since these are all privately owned, and there are no known plans for any recreational development, they were not considered a "Resource". The discussion covers the only recreational resources present in the watershed.

Comment 4: Environmental Impacts should be more fully described.

Response: This section has been expanded in the final EIS.



Comment 5: Alternatives need to be analyzed in more detail.

Response: The final EIS has been expanded to more fully analyze the various alternatives. A table has been provided to summarize the impacts for easy comparison.

Comment 6: Short-term vs. Long-term use of Resources does not analyze the cumulative long-term impact of the action.

Response: This section has been revised to more fully cover the subject in the final statement.

#### United States Environmental Protection Agency

Comment 1: Municipal and industrial problems need clarification.

Response: The municipal, industrial, and irrigation problems section in the environmental impact statement has been expanded in the final EIS.

Comment 2: Clarification is needed in describing the oil field activity and possible pollution effects of such activities.

Response: This area has been expanded in the final statement.

Comment 3: Adverse impacts of secondary growth in the community (such as water, air, noise, and solid waste pollution) were not shown.

Response: This portion of the final statement has been expanded to consider adverse effects caused by secondary growth.

#### National Audubon Society

Comment 1: The Society stated that they were familiar with the project area and that wetlands in the vicinity were a low quality habitat for migratory waterfowl and other wetland-oriented wildlife. They also stated that the watershed project had the potential to create or improve habitat for migratory waterfowl, as well as for other wetland and upland wildlife species.

Response: Noted.

Comment 2: The Society pointed out that many farm ponds had been constructed in Oklahoma under the justification that they would be beneficial to wildlife species as well as for flood control. The Society stated that many of these ponds are virtually of no value to

wildlife, particularly migratory waterfowl. They cited research data which indicated that most waterfowl did not utilize ponds with a surface area of less than three acres.

Response: There are three types of farm ponds which have been eligible for cost sharing assistance in the past. These types are: (1) stock-water - to furnish a needed source of water for livestock, (2) erosion control - to control an eroding overfall and thus prevent further erosion, and (3) recreation - to supply water for recreational purposes. The three types of structures can be essentially the same in appearance after they are constructed. However, wildlife benefits are not used as a part of the justification for cost sharing. Although some of the larger ponds do have a small amount of flood storage in their design, this is to provide protection to the vegetated earthen spillway, rather than to provide flood control. Flood control is not used as a justification for cost sharing on any of the three types of farm ponds. Any farm pond can vary from less than an acre to several acres in size based on individual requirements.

Comment 3: The Society furnished recommendations which it felt would be beneficial for wildlife if incorporated into the project plan. It recommended that all water impoundments have a minimum surface area of three acres along with fencing to defer the pond shoreline from grazing. They also recommended that all plans for wildlife development be coordinated with the Oklahoma Department of Wildlife Conservation.

Response: The average surface area of the floodwater retarding structures in the Pott-Sem-Turkey Watershed is 27 acres and none are smaller than 3 acres (see Appendix E).

There are two types of reservoirs planned for the project: farm ponds, as described in the response to comment 2 above, which will be installed by landusers; and floodwater retarding structures which will be installed by the sponsoring local organization. The Service through the District will provide technical assistance to the landuser in the planning of the farm ponds and will furnish technical assistance in incorporating features for wildlife enhancement in the plans for the structure if desired by the landuser.

The sponsors considered the suggestion concerning fencing of the floodwater retarding structures. This would require additional land rights, construction cost, and O&M costs which would be borne by the sponsoring local organization. At this time they chose not to include the suggested plan feature for wildlife enhancement. The sponsoring local organization will cooperate with landusers who want to enhance the structures for wildlife during the installation stage. It should be noted that plantings are included to replace habitat being destroyed by the floodwater retarding structures.

At the present time, all of the SCS flood control projects are closely coordinated with both the State and Federal wildlife agencies, almost from their inception.

State Clearing House -

Comment: Reported that the state agencies comprising the Pollution Control Coordinating Board had reviewed the proposed project and agreed that no adverse environmental impact was anticipated.

Response: Noted.

Department of the Army -

Comment: Stated that they considered the draft environmental statement to be satisfactory.

Response: Noted.

Oklahoma Historical Preservation Officer -

Comment: No historical sites are listed for the watershed and that no new historical archeological sites worthy of National Register status were located during the archeological survey. He had no objection to the project.

Response: Noted.

Governor of Oklahoma -

Comment: The governor advised that the state concurred in the plan and was agreeable to installation of the planned measures.

Response: Noted.



LIST OF APPENDICES

Appendix A - Comparison of Benefits and Costs for Structural Measures

Appendix B - Letters of Comment Received on the Draft Environmental Statement

Appendix C - Cross-Section of a Typical Floodwater Retarding Structure

Appendix D - Project Map

Appendix E - Structural Data

Approved by \_\_\_\_\_ Date \_\_\_\_\_



## APPENDIX A - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Pott-Sem-Turkey Watershed, Oklahoma  
(Dollars)

Evaluation Unit	AVERAGE ANNUAL BENEFITS 1/			Average Annual Cost	Benefit Cost Ratio
	Damage	Secondary	Total		
Floodwater Retarding Structures 1 thru 11	84,010	16,450	100,460	58,229	1.7:1
Project Administration	xxxxxx	xxxxxx	xxxxxx	9,764	xxxxx
GRAND TOTAL	84,010 2/	16,450	100,460	67,993	1.5:1

1/ Price Base: Current normalized (dated 10/15/73).  
 2/ In addition, it is estimated that land treatment measures will  
 provide flood damage reduction benefits of \$5,340 annually.

June 1975





## APPENDIX B







# United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

In Reply Refer To:  
PEP: ER-74/1439

Dear Mr. Burns:

Thank you for your letter of November 15, 1974, requesting our views and comments on the draft environmental impact statement and work plan for Pott-Sem-Turkey Watershed Seminole and Pottawatomie Counties, Oklahoma. Comments on both documents are presented below.

## Draft Work Plan

As a general comment, since the report is based largely on the environmental impact statement, the format could remain the same for both documents. Rearranging paragraphs does not seem to serve a useful purpose. In fact, in some cases the same headings should be used for both documents; e.g., the same information is given in the plan under the heading "Fish and Wildlife Resources" as that given in the draft environmental impact statement under "Plant and Animal Resources." Therefore, the same heading should be used.

Conversion of pasture to croplands in the bottomlands could adversely affect wildlife habitat unless measures are taken to avoid an unfavorable impact. Therefore clarification is needed on page 30, Effects of Works of Improvement--Fish and Wildlife. It is stated that wildlife habitat to be destroyed would be predominantly in the floodplain. Wildlife species such as squirrels, bobwhites, cottontails, and whitetailed deer utilize these floodplain-timber areas largely for feeding and escape cover. It is further stated that, as a result of timber clearing, alfalfa or feed crops would be planted and these crops would tend to offset the adverse effects to wildlife if any clearing did occur. The adverse effects would be offset only if the clearing is interspersed with tracts of timber to form valuable ecotonal habitat. If large tracts are cleared, alfalfa or feed crops would not furnish adequate escape cover for the wildlife species noted.



*Save Energy and You Serve America!*



# United States Department of the Interior

2

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

The report indicates that the quality of surface water is impaired by oil-field activities but does not indicate how the reservoirs will affect water quality. One might expect that quality will deteriorate during periods of low flow when evaporation rates are high, thereby increasing the dissolved mineral concentration. This would be a consideration if the water is to be used for irrigation, as indicated in the report.

The report does not provide any information on the effect of reservoirs on ground water in the underlying aquifers, and the effects of the reservoirs on water levels in the alluvium and bedrock below the dams.

If funds are not available to the National Park Service for salvage excavation, the Soil Conservation Service will be responsible for implementing the measures proposed to mitigate impacts to cultural resources, page 21, paragraph 4.

An examination of library and file data without benefit of field investigation revealed that during 1972 mineral deposits in Seminole County yielded petroleum, natural gas liquids, natural gas, stone, clays, and sand and gravel valued at about \$29.9 million. During the same period, deposits in Pottawatomie County yielded petroleum, natural gas, sand and gravel, and stone valued at about \$8.4 million.

The Bureau of Sport Fisheries and Wildlife should be changed to the U. S. Fish and Wildlife Service, page 50 and page 14.

## Draft Environmental Statement

A preliminary draft statement for this watershed project was reviewed on March 8, 1973. Our comments at that time suggested that the document should contain a discussion of petroleum exploration and development activities and related pipelines in the area. The review also suggested that project plans should provide for continued access to known petroleum reserves and exploration. Because neither document discusses plans for purchasing, subordinating, nor in fact for protecting minerals, mineral rights or leases, or related physical developments that may conflict with the proposed structural measures, we assume that the project will not interfere with the search for nor the recovery of these resources. This, then, should be stated.



The project map in the statement shows several pipelines that cross the watershed and that one, a 6-inch high-pressure line owned by Texaco, crosses the flood pool of Structure No. 2. However, pipeline protection is not discussed in either document except on page 52 of the work plan where it is stated that modification of roads, bridges, pipelines, and powerlines was considered in arriving at a system of least costly measures to accomplish project objectives. Similarly, the work plan on page 22 lists a utility line, road, and bridge as needing modification but does not discuss the pipeline.

The final statement therefore should recognize the existence of petroleum exploration and development activity in the area, explain the effect of the structural measures on known mineral reserves and mineral installation, and the plans for alleviating conflicts should they develop.

The Soil Conservation Service will be responsible for implementing the measures proposed to mitigate impacts to cultural resources if funds are not available to the National Park Service, page 4, paragraph 2.

On page 12, the archeological-historical work seems to have been coordinated but this is not brought out. The final statement should indicate the coordination and compliance with Historic Preservation Act and include comments of the State Historic Preservation Officer.

It is stated on page 13 that the average annual acres flooded are estimated to be 2,252 acres. The statement is made on page 14 that a 2-year frequency storm of 24-hour duration will flood 1,707 acres. On pages 13 and 18 it is stated that the 100-year frequency storm will flood 2,564 acres. These figures are somewhat confusing and should be clarified.

As stated on page 10, there are no wetland acres in the watershed. However, item 3 on page 23 states that the project will facilitate control of mosquitoes and other disease vectors. It is difficult for us to visualize how constructing 11 sediment pools will facilitate mosquito control. Also, item number 7 on the same page is confusing. Does the statement mean to say, "Project structures will control flash flooding that otherwise would move downstream and result . . . "?



It should be stated on page 24 whether or not the \$214,800 cost for the accelerated land treatment plan will be the same amount, or more or less than the amount, that would be spent in the 10-to-15-year standard development plan.

It would be helpful if a tabular summary were provided in the alternative section to help reference the information presented.

General Comments - We wish to submit the following observations on the impact statement format for your consideration and use.

#### Planned Project

Description of the proposed action is very general. It should provide sufficient information and technical data to permit the reader to make an adequate assessment of the environmental impacts. For example, there are no locations given for any of the proposed improvements. In addition, individual specifications for the structural measures are lacking.

#### Environmental Setting

Plant and Animal Resources - This sub-section limits its discussion to wildlife and does not discuss other animal resources nor does it discuss plants.

Recreational Resources - This brief discussion is limited to public recreation areas which are non-existent and ignores recreational resources.

#### Environmental Impact

This section should fully describe the probable impacts of the proposed action on the environment, and it should analyze primary and secondary significant consequences for the environment. Animal species that would be affected by the loss of habitat are not mentioned. The water-oriented wildlife that is to benefit from this construction is not discussed; nor is there an explanation of mosquito control. If there is a possibility of eutrophication of the stream system, its effects must be stated.

We suggest a more thorough impact analysis be quantified to the extent possible.

## Alternatives

The environmental impacts of each alternative should be analyzed in sufficient detail to allow an environmental comparison between alternatives and the proposed action. This section presently appears to be written as a justification of the proposed project rather than an objective and comprehensive analysis including discussion of the various alternatives and their environmental impacts. We do not think alternatives should be dismissed on the basis of economics, but analyzed for their environmental impact. Our suggestion to strengthen this section is to separate each alternative and thoroughly describe and analyze all of its environmental impacts.

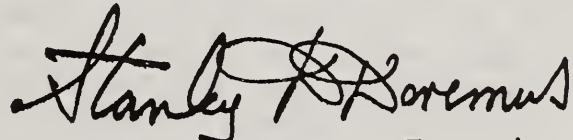
## Short-Term vs. Long-Term Use of Resources

The purpose of this section should be to relate man's short-term use of the environment against the long-term productivity. This section does not analyze the cumulative long-term impact of the action on agriculture, wildlife, or related land use.

It is requested that the enclosed report of the U.S. Fish and Wildlife Service accompany the work plan when it is forwarded to the Congress and that the recommendations set forth in this report be given full consideration when this project is to be built.

We hope these comments will be of assistance to you in preparing your final documents.

Sincerely yours,



Secretary of the Interior

Mr. Hampton Burns  
State Conservationist  
Soil Conservation Service  
Department of Agriculture  
Stillwater, Oklahoma 74074

Enclosure

U.S. Fish and Wildlife Service  
Report of September 28, 1970







UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VI  
1600 PATTERSON  
DALLAS, TEXAS 75201

January 2, 1975

Mr. Hampton Burns  
State Conservationist  
Soil Conservation Service  
State Office  
Stillwater, Oklahoma 74074

Re: D-SCS-G36003--OK

Dear Mr. Burns:

We have reviewed your Draft Environmental Impact Statement for the Pott-Sem-Turkey Watershed. The proposed project is in Pottawatomie and Seminole counties, Oklahoma. When completed, the facility will include 11 floodwater retarding structures for the reduction of floodwater, sediment, and erosion damages on 2,564 acres of flood plain land.

The following comments are for your consideration in finalizing the statement:

1. The section, Municipal and Industrial Water Problems needs clarification; a description of potential sources of water for municipal and industrial uses should be given if such a source exists, or the statement should indicate there is no potential source.

2. On page 17 it is suggested that the high mineral content in area streams is due primarily to salt, much of which comes from oil-field brines. Also, sediment pool, site 5, is described (page 22) as receiving pollution from the runoff of salted-out areas around oil wells. Clarification is needed; in that, is the oil activity expected to continue adding potential pollutants to the area waters, or is all such pollution from salted out areas (areas no longer increasing the amount of available pollutants for area waters).


3. On page 22, in addition to recognizing the beneficial effects of secondary growth generated by the project's completion, consideration should be given to the potential adverse impacts of secondary growth in the community (such as water, air, noise, and solid waste pollution).

These comments classify your Draft Environmental Impact Statement as LO-2. Specifically, we have no objection to the proposed project. However, additional information is needed for assessing the total impacts on the environment. The classification and the date of our comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal actions, under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the attachment. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and on the adequacy of the impact statement at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft Environmental Impact Statement. Please send us two copies of the Final Environmental Impact Statement at the same time it is sent to the Council on Environmental Quality.

Sincerely yours,

  
Arthur W. Busch  
Regional Administrator

Enclosure

## NATIONAL AUDUBON SOCIETY

ROOM 211 MURRAY HALL, OSU, STILLWATER, OKLA. 74074 (405) 372-6211 EXT.: 7717

January 13, 1975

Mr. Hampton Burns  
State Conservationist  
United States Department Of Agriculture  
Soil Conservation Service  
State Office, OSU  
Stillwater, Ok. 74074

Dear Mr. Burns:

Thank you for allowing National Audubon Society the opportunity to comment on the USDA SOIL CONSERVATION SERVICE DRAFT ENVIRONMENTAL IMPACT STATEMENT for The Pott-Sem-Turkey Watershed, Oklahoma.

I am familiar with the area of the proposed project, and would currently consider the wetlands of this area to be low quality habitat for migratory waterfowl and other wetland-oriented wildlife. The waters of these wetlands are highly turbid, aquatic plant communities are generally absent or extremely sparse, and many acres of hardwood timber have been flooded for a long enough period that most trees are dead or dying. Therefore, the Pott-Sem-Turkey Watershed Project has the potential to create or improve habitat for migratory waterfowl, as well as for other wetland and upland wildlife species.

I must point out at this time, however, that many farm ponds have already been constructed in our state under the multiple justification that they are both beneficial to wildlife species as well as for flood control. Unfortunately, many of these ponds are virtually of no value to wildlife, particularly migratory waterfowl.

An example of these type farm ponds was disclosed by recent studies in Western Oklahoma where 70 percent of the farm ponds, within the study area, were seldom or never frequented by wintering waterfowl. Eighty-seven percent of all waterfowl were observed on 30 percent of the ponds in a random sample, and these ponds were occupied by waterfowl an average of 93 percent of the observation



periods. Acreage, depths, circumference, aquatic and shoreline plant communities, invertebrate populations and various water parameters of each sample pond were measured to identify the factors that encouraged waterfowl to use these ponds for feeding or resting.

Food availability and, most importantly, pond size were found to be the major characteristics which resulted in the use or lack of use of a pond by waterfowl. The 30 percent of ponds sampled on which 87 percent of all waterfowl were observed were all larger than three acres. Some of the ponds smaller than three acres also supported aquatic plant communities, but were not used, apparently because they did not provide security from disturbance that existed on larger ponds.

A significant correlation was also observed between pond size and the abundance and variety of aquatic plant food species encountered in any particular pond. Cattle watered in and grazed on emergent aquatics of all ponds, and the effects of their activities on the pond community increased significantly with smaller sizes of ponds. The activities of cattle had no significant effect on ponds larger than three acres. The ratio of cattle to square feet of shallow water was greater for ponds in the one to three acre size class, and emergent plant species were usually sparse or absent, due to more intense grazing. The shallow waters of ponds less than one acre were generally trampled to the extent that no aquatic species survived, due to grazing, trampling and high water turbidity, rendering them as "mud holes".

I present this brief summary of research findings to illustrate that data are now available that should be incorporated in to guidelines for construction of farm ponds and other flood control impoundments that are truly desirable wildlife habitats. The potential does exist for all ponds such as those proposed in the Pott-Sem-Turkey Watershed project to fulfill the needs of soil, water, fish and wildlife conservation. The results of the above mentioned research are in manuscript form at this time and will soon be available through this office or from the Oklahoma Department of Wildlife Conservation.

The following recommendations are based on mentioned research.

1. All ponds should be constructed so the sizes of their sediment pools are a minimum of three acres, and 25 to 50 percent of their surface acres should be a maximum of three feet deep. In instances where the construction site of a pond will not facilitate a three acre or larger sediment pool, the pond should be constructed as large as possible.

2. Plans are mentioned in the Impact Statement for the Pott-Sem-Turkey Watershed to develop food and cover plantings as mitigation for destroyed wildlife habitat. Fencing to defer pond shorelines from grazing rather than development of artificial plantings would be much more beneficial to the pond quality, fish populations and many wildlife species, particularly wintering waterfowl, and would, possibly, provide cover that would be used by waterfowl for nesting in Summer.

3. All farm ponds with sediment pools smaller than three acres should be fenced entirely, and fencing should include a minimum of one travel lane to facilitate a watering site(s) for cattle.

4. Farm ponds and other impoundments with sediment pools larger than three acres should be only partially fenced with the deferred acres adjacent to the inflow section of the pond. Partial fencing will provide greater access for cattle to water, and will allow cattle to graze emergent plant species, controlling rank growths of those species in the unfenced sections of larger ponds.

5. Data are not available on which positive recommendations can be made for the number of acres that should be deferred to fencing for any particular pond. This must be determined by trial and error or further research. As a starting point, however, I suggest that for ponds with sediment pools smaller than three acres, a deferred acreage be fenced equal to the surface acreage of the detention pool plus the surface acreage of the sediment pool. This will assure that all deferred habitat will not be inundated during flood stage. The acres to be deferred for impoundments with sediment pools larger than three acres should equal the surface acreage of the sediment pool plus that section of the shoreline within the detention pool adjacent to the deferred acreage.

6. Other research has found it desirable to situate deferred acres in a continuous block. This discourages use of the acres as travel lanes for predators and thereby reduces, particularly, nest predation. This can be accomplished if the majority of the protected acres are on one side of a pond, rather than distributed equally around the pond.

In conclusion, more work is need to refine the above recomen-  
dations, but the research on which they are founded does provide  
a basis for improved design of wetland habitat development. It  
will be imperative that these activities be coordinated with the  
migratory bird and fishery sections of the Oklahoma Department of  
Wildlife Conservation.

If this office can be of further assistance, please let us  
know. Thank you very much.

Sincerely,

A handwritten signature in dark ink, appearing to read "Tom Logan", is written over a faint, circular official stamp.

Tom Logan, Asst. Dir.  
Sanctuary Department

cc: John Anderson, Dir. Sanct. Dept. NAS  
Charles Callison, Exec. Vice-Pres. NAS  
Ronald Klataske, West Central Rep. NAS  
I. H. Standefer, Dir. ODWC





STATE OF OKLAHOMA

# State Grant-In-Aid Clearinghouse

4901 N. LINCOLN BLVD. • OKLAHOMA CITY, OKLAHOMA 73105 • PHONE (405) 521-2187

December 2, 1974

Mr. Hampton Burns  
State Conservationist  
Soil Conservation Service  
State Office  
Stillwater, Oklahoma 74074

RE: 18K406--Draft Work Plan and Environmental Impact Statement  
for Pott-Sem-Turkey Watershed

Dear Mr. Burns:

The above project has been reviewed in accordance with OMB Circular A-95 and Section 102 (2) (C) of the National Environmental Policy Act by the state agencies charged with enforcing environmental standards in Oklahoma.

The state agencies, comprising the Pollution Control Coordinating Board, have reviewed the proposed project and agree that no adverse environmental impact is anticipated. Therefore, the state clearinghouse requires no further review.

Sincerely,

A handwritten signature in cursive script, reading "Don N. Strain", is written over a horizontal line.

Don N. Strain  
Director

DNS:ms

cc: COEDD





DEPARTMENT OF THE ARMY

WASHINGTON, D.C. 20310

Honorable Robert W. Long  
Assistant Secretary of Agriculture  
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist, on behalf of the Administrator of the Soil Conservation Service, by letter dated 15 November 1974, requested the views of the Secretary of the Army on the Watershed Work Plan and Draft Environmental Statement for the Pott-Sem-Turkey Watershed, Oklahoma.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department. The draft environmental statement is considered to be satisfactory.

Sincerely,

A handwritten signature in cursive script, reading "Charles R. Ford", is positioned above the typed name.

Charles R. Ford  
Chief  
Office of Civil Functions



# OKLAHOMA HISTORICAL SOCIETY



FOUNDED MAY 27, 1893

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Q. B. BOYDSTUN  
*Fort Gibson*

O. B. CAMPBELL  
*Vinita*

HERSCHAL H. CROW, JR.  
*Altus*

JOE W. CURTIS  
*Pauls Valley*

HARRY L. DEUPREE, M.D.  
*Oklahoma City*

\*LEROY H. FISCHER  
*Stillwater*

BOB FORESMAN  
*Tulsa*

E. MOSES FRYE  
*Stillwater*

NOLEN FUQUA  
*Duncan*

DENZIL D. GARRISON  
*Bartlesville*

A. M. GIBSON  
*Norman*

JOHN E. KIRKPATRICK  
*Oklahoma City*

W. E. McINTOSH  
*Tulsa*

JAMES D. MORRISON  
*Durant*

FISHER MULDROW  
*Norman*

MRS. CHARLES R. NESBITT  
*Oklahoma City*

EARL BOYD PIERCE  
*Muskogee*

\*JORDAN B. REAVES  
*Oklahoma City*

GENEVIEVE SEGER  
*Geary*

H. MERLE WOODS  
*El Reno*

MURIEL H. WRIGHT  
*Emeritus*  
*Oklahoma City*

HISTORICAL BUILDING  
OKLAHOMA CITY, OKLAHOMA 73105

March 11, 1975

Mr. Hampton Burns  
State Conservationist  
U.S. Dept. of Agriculture  
Soil Conservation Service  
State Office  
Stillwater, Oklahoma 74074

Dear Mr. Burns:

The Oklahoma Historical Society records show no listed Historic Sites within the boundaries of the proposed "Pott-Sem-Turkey" Watershed project as submitted to this office.

Oklahoma Conservation Commission Archeologist, Charles Wallis, reports no new Sites, either Historical or Archeological, that could be deemed worthy of National Register status.

Within our present scope of understanding of the facts, the Oklahoma Historical Society has no objection to the implementation of the "Pott-Sem-Turkey" Watershed project.

Respectfully,

  
George H. Shirk  
State Historic Preservation Officer

cc: Mr. J. Wettengel  
C.E. Metcalf



STATE OF OKLAHOMA  
OFFICE OF THE GOVERNOR  
OKLAHOMA CITY

DAVID L. BOREN  
GOVERNOR

April 16, 1975

Mr. Hampton Burns  
State Conservationist  
Soil Conservation Service  
USDA Building  
Stillwater, Oklahoma 74074

Dear Mr. Burns:

Based on our review of the draft plan and environmental statement for the Pott-Sem-Turkey Creek Watershed plan, we want to advise that the State concurs in the plan and is agreeable to installation of the planned measures.

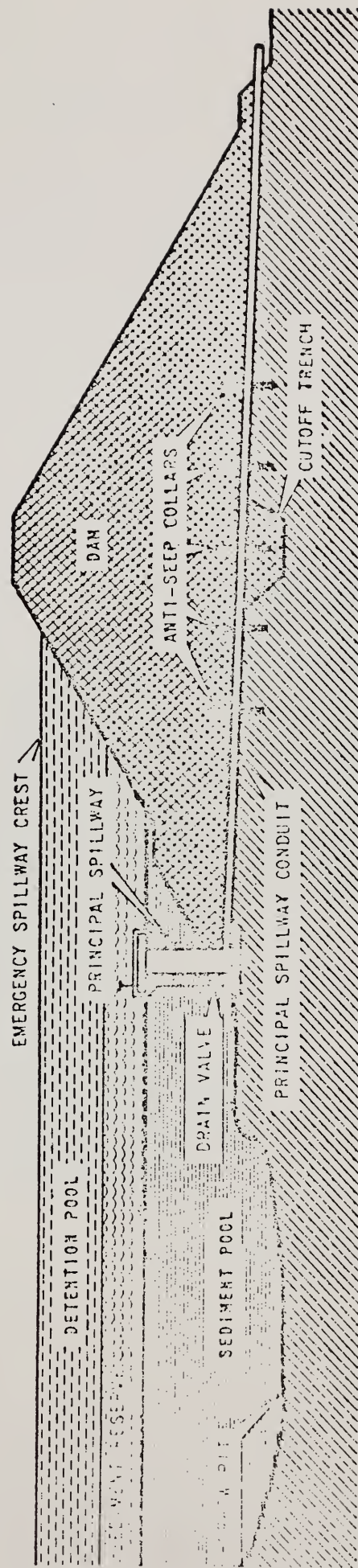
Sincerely yours,

A handwritten signature in black ink, which appears to read "David L. Boren". The signature is written in a cursive, flowing style.

DAVID L. BOREN





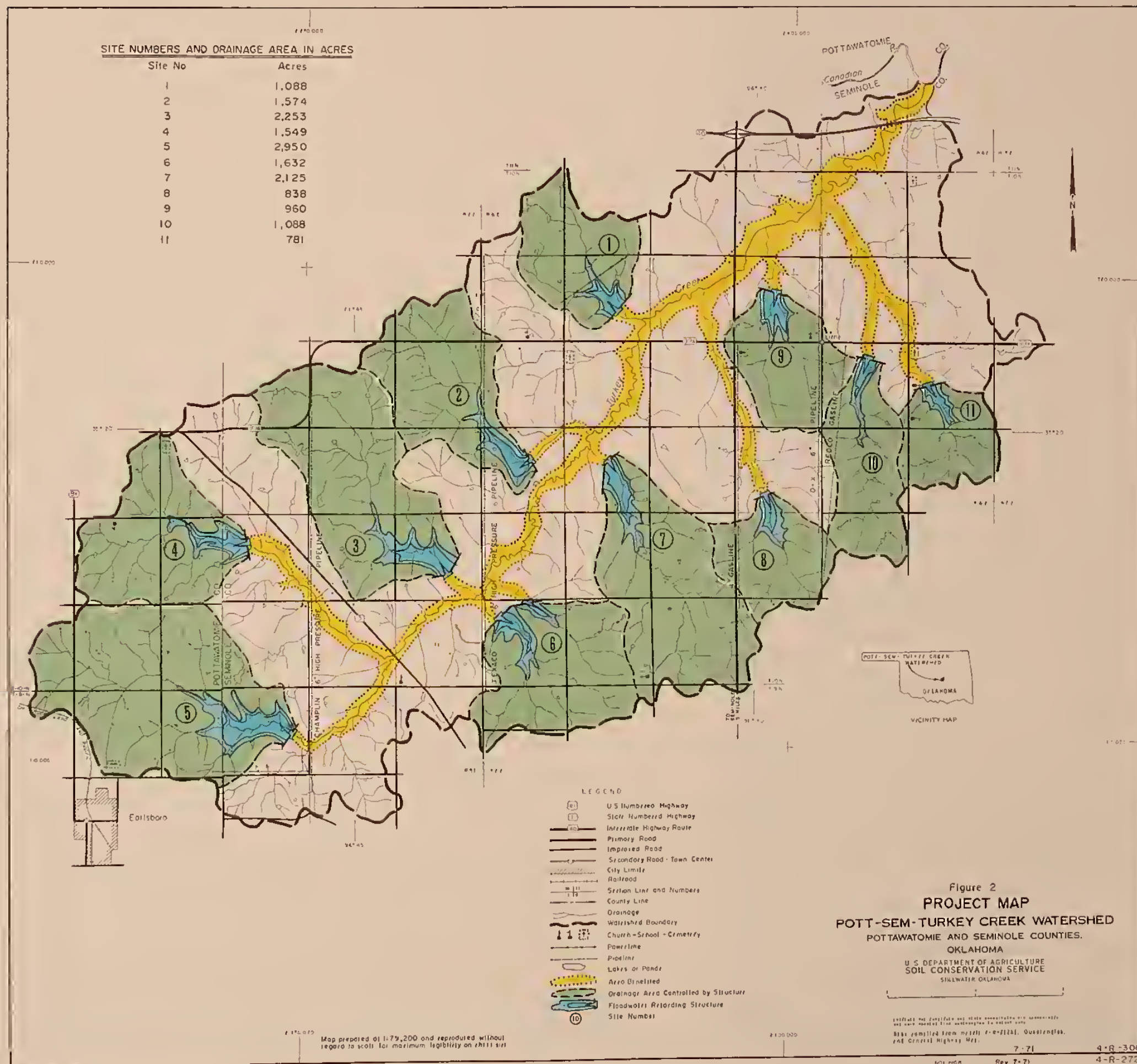


SECTION OF A TYPICAL FLOODWATER RETARDING STRUCTURE



## SITE NUMBERS AND DRAINAGE AREA IN ACRES

Site No	Acres
1	1,088
2	1,574
3	2,253
4	1,549
5	2,950
6	1,632
7	2,125
8	838
9	960
10	1,088
11	781





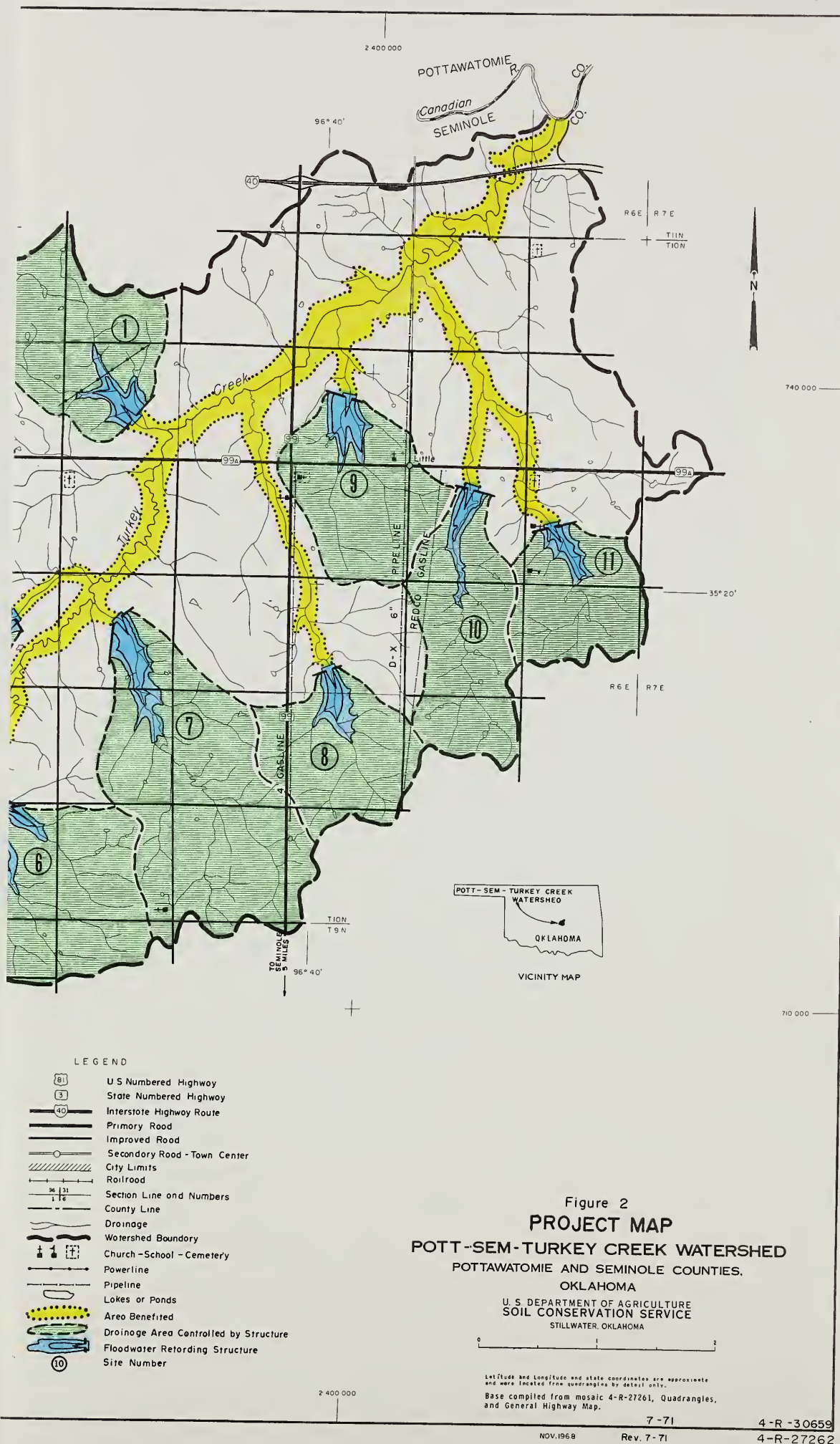


TABLE 3 - STRUCTURAL DATA

Pott-Sem-Turkey Watershed, Oklahoma

Item	Unit	Structure Number					
		1	2	3	4	5	6
Class of Structure							
Drainage Area	Sq.Mi.	1.70	2.46	3.52	2.42	4.61	2.55
Curve No. (1 day)(AMC II)		75	75	75	75	75	75
Tc	Hrs.	1.14	1.71	2.07	.95	2.22	1.25
Elevation Top of Dam	Ft.	924.8	944.2	952.7	991.5	980.4	951.6
Elevation Crest Emergency Spillway	Ft.	922.8	942.2	950.7	989.2	978.4	949.4
Principal Spillway Crest Elev. (50-year)	Ft.	912.6	932.4	940.8	976.9	968.5	939.4
Maximum Height of Dam	Ft.	23.8	23.2	24.7	22.5	25.5	22.6
Volume of Fill	Cu.Yds.	65,400	47,300	56,400	56,250	53,900	86,000
Total Capacity	Ac.Ft.	568	743	1,107	794	1,500	749
Sediment Submerged 1st 50-years	Ac.Ft.	73	90	122	115	194	82
Sediment Submerged 2nd 50-years	Ac.Ft.	68	84	114	107	182	74
Sediment Aerated	Ac.Ft.	20	25	34	31	52	22
Retarding	Ac.Ft.	407	544	837	541	1,072	571
Surface Area							
Sediment Pool (50-year)	Acres	22	34	40	25	54	26
Retarding Pool	Acres	79	109	180	96	224	114
Principal Spillway Design							
Rainfall Volume (Areal)(1-day)	In.	7.10	7.10	7.10	7.10	7.10	7.10
Rainfall Volume (Areal)(10 day)	In.	11.80	11.80	11.80	11.80	11.80	11.80
Runoff Volume (10 day)	In.	6.09	6.09	6.09	6.09	6.09	6.09
Capacity of Principal Spillway (Max.)	cfs	28	50	56	31	69	51
Frequency Operation-Emer. Spwy.	%Chance	2.7	4.0	2.8	3.6	4.0	4.0
Dimension of Conduit	In.	18	24	24	18	24	24
Emergency Spillway Design							
Rainfall Volume (ESH)(Areal)	In.	6.50	6.50	6.50	6.50	6.50	6.50
Runoff Volume (ESH)	In.	3.71	3.71	3.71	3.71	3.71	3.71
Storm Duration	Hrs.	6	6	6	6	6	6
Type		Veg.	Veg.	Veg.	Veg.	Veg.	Veg.
Bottom Width	Ft.	50	100	100	50	100	54
Velocity of Flow (Ve) 1/	Ft./Sec.	4.05	4.05	4.05	4.45	4.05	4.30
Slope of Exit Channel 1/	Ft./Ft.	.0310	.0310	.0310	.0290	.0310	.0300
Maximum Water Surface Elevation	Ft.	-	-	-	-	-	-
Freeboard Design							
Rainfall Volume (FH)(Areal)	In.	9.30	9.30	9.30	9.30	9.30	9.30
Runoff Volume (FH)	In.	6.22	6.22	6.22	6.22	6.22	6.22
Storm Duration	Hrs.	6	6	6	6	6	6
Maximum Water Surface Elevation	Ft.	924.8	943.9	952.4	991.5	980.2	951.6
Capacity Equivalents							
Sediment Volume	In.	1.77	1.52	1.44	1.96	1.74	1.31
Retarding Volume	In.	4.49	4.15	4.46	4.19	4.35	4.20

(See footnotes on last page of Table 3)

June 1975



TABLE 3 - STRUCTURAL DATA

## Pott-Sem-Turkey Watershed, Oklahoma

Item	Unit	Structure Number											Total
		7	8	9	10	11	:	:	:	:	:	:	
Class of Structure	Sq.Mi.	3.32	1.31	1.50	1.70	1.22	a	b	a	b	a	b	26.31
Drainage Area		75		75	75	75							
Curve No. (1 day)(AMC II)													
Tc	Hrs.	1.98	.88	1.12	1.21	1.01							
Elevation Top of Dam	Ft.	941.0	968.0	916.7	951.7	949.8							
Elevation Crest Emergency Spillway	Ft.	938.5	966.0	914.7	946.7	947.8							
Principal Spillway Crest Elev. (50-Yr)	Ft.	926.0	955.9	906.2	933.2	939.1							
Maximum Height of Dam	Ft.	27.6	21.0	20.7	33.7	22.3							
Volume of Fill	Cu.Yds.	85,000	41,600	32,100	104,000	38,300							666,250
Total Capacity	Ac.Ft.	990	381	442	591	374							8,239
Sediment Submerged 1st 50-years	Ac.Ft.	103	38	52	59	45							973
Sediment Submerged 2nd 50-years	Ac.Ft.	95	36	49	55	42							906
Sediment Aerated	Ac.Ft.	29	10	14	16	12							265
Retarding	Ac.Ft.	763	297	327	461	275							6,095
Surface Area													
Sediment Pool (50-year)	Acres	30	13	20	16	17							297
Retarding Pool	Acres	123	54	75	66	60							1,180
Principal Spillway Design													
Rainfall Volume (Areal)(1 day)	In.	7.10	7.10	7.10	8.00	7.10							
Rainfall Volume (Areal)(10 day)	In.	11.80	11.80	11.80	13.25	11.80							
Runoff Volume (10 day)	In.	6.09	6.09	6.09	7.31	6.09							
Capacity of Principal Spwy. (Max.)	cfs	50	27	27	28	29							
Frequency Operation-Emergency Spwy.	%Chance	4.0	2.7	3.1	2.0	3.0							
Dimension of Conduit	In.	24	18	18	24	18							
Emergency Spillway Design													
Rainfall Volume (ESH)(Areal)	In.	6.50	6.50	6.50	9.30	6.50							
Runoff Volume (ESH)	In.	3.71	3.71	3.71	6.22	3.71							
Storm Duration	Hrs.	6	6	6	6	6							
Type		Veg.	Veg.	Veg.	Veg.	Veg.							
Bottom Width	Ft.	50	50	50	60	50							
Velocity of Flow (Ve) 1/	Ft./Sec.	4.68	4.05	4.05	3.39	4.05							
Slope of Exit Channel 1/	Ft./Ft.	.0280	.0310	.0310	.0340	.0310							
Maximum Water Surface Elevation	Ft.	-	-	-	948.3	-							
Freeboard Design													
Rainfall Volume (FH)(Areal)	In.	9.30	9.30	9.30	15.70	9.30							
Runoff Volume (FH)	In.	6.22	6.22	6.22	12.31	6.22							
Storm Duration	Hrs.	6	6	6	6	6							
Maximum Water Surface Elevation	Ft.	941.0	968.9	916.5	951.7	949.4							
Capacity Equivalents													
Sediment	In.	1.28	1.20	1.44	1.43	1.53							
Retarding Volume	In.	4.31	4.26	4.09	5.09	4.22							

1/ Based on 25 percent of the maximum discharge during passage of the freeboard hydrograph except structure number 10.





